Design for the Real World

by: Victor Papanek

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A REVOLUTIONARY BOOK ABOUT THE SAFE, INEXPENSIVE PRODUCTS WE NEED TO HELP US BEAT EARTH'S ENERGY/RESOURCES CRUNCH.

VICTOR PAPANEK

DESIGN FOR THE REAL WORLD

HUMAN ECOLOGY AND SOCIAL CHANGE
WITH AN INTRODUCTION BY
R. BUCKMINSTER FULLER
COMPLETELY ILLUSTRATED

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Victor Papanek

is Dean of the School of Design at the California Institute of the Arts. He is also:

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by VICTOR PAPANEK

Human Ecology and Social Change

With an introduction by
R. BUCKMINSTER FULLER

BANTAM BOOKS
Toronto/New York/London

This volume is dedicated to my students,
for what they have taught me.

DESIGN FOR THE REAL WORLD

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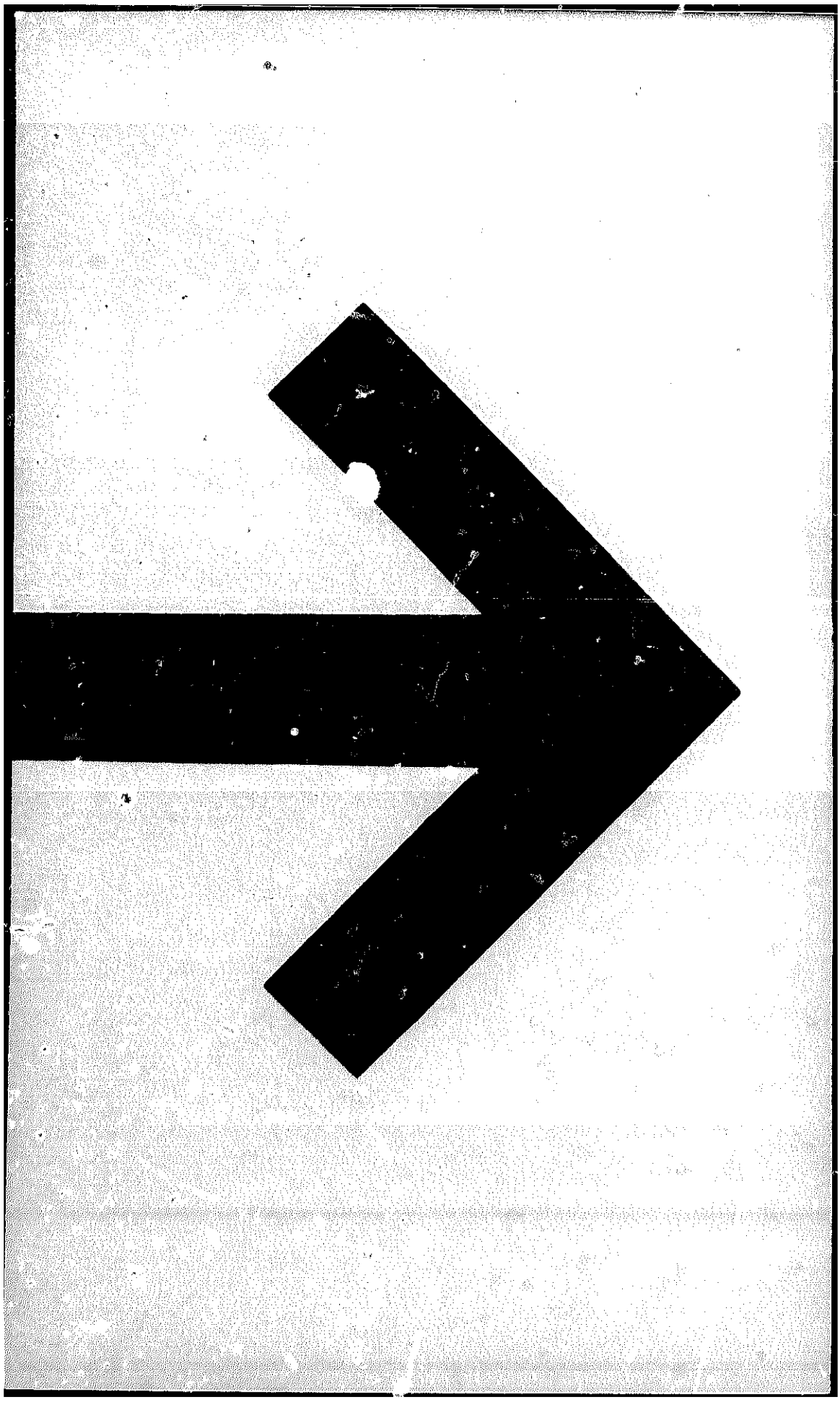

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INTRODUCTION

There are wonderful friendships which endure both despite and because of the fact that the individuals differ greatly in their experiential viewpoints while each admires the integrity which motivates the other. Such friendships often are built on mutual reaction to the same social inequities and inefficiencies. However, having widely differing backgrounds, they often differ in their spontaneously conceived problem-solution strategies.

Victor Papanek and I are two such independently articulating friends who are non-competitive and vigorously cooperative. Long a Professor of Design at Purdue University, Victor Papanek now teaches that subject at the California Institute of the Arts. I am a "University Professor" at Southern Illinois University. I am a deliberate comprehensivist and do not operate in a department. Though I am a professor, I don't profess anything. The name of my professorship is "Comprehensive, Anticipatory Design-Science Exploration." I search for metaphysical laws governing both nature's a priori physical designing and the elective design initiatives of humans. It is typical of our friendship that I am permitted to write this introduction.

In this book, Victor Papanek speaks about everything as design. I agree with that and will elaborate on it in my own way.

To me the word "design" can mean either a weightless, metaphysical conception or a physical pattern. I tend to differentiate between design as a subjective experience, i.e., designs which affect me and produce involuntary and often subconscious reactions, in contradistinction to the designs that I undertake objectively in response to stimuli. What I elect to do consciously is objective design. When we say there is a design, it indicates that an intellect has organized events into discrete and conceptual inter-patternings.

Snowflakes are design, crystals are design, music is design, and the electromagnetic spectrum of which the rainbow colors are but one millionth of its range is design; planets, stars, galaxies, and their contained behaviors such as the periodical regularities of the chemical elements are all design-accomplishments. If a DNA-RNA genetic code programs the design of roses, elephants, and bees, we will have to ask what intellect designed the DNA-RNA code as well as the atoms and molecules which implement the coded programs.

The opposite of design is chaos. Design is intelligent or intelligible. Most of the design subjectively experienced by humans is a priori the design of sea waves, winds, birds, animals, grasses, flowers, rocks, mosquitoes, spiders, salmon, crabs, and flying fish. Humans are confronted with an a priori, comprehensive, designing intellect which for instance has designed the sustenance of life on the planet we call Earth through the primary impoundment of Sun energy on Earth by the photosynthetic functioning of vegetation, during which process all the by-product gases given off by the vegetation are designed to be the specific chemical gases essential to sustaining all mammalian life on Earth, and when these gases are consumed by the mammals, they in turn are transformed, again by chemical combinings and disassociations, to produce the by-product gases essential to the regeneration of the vegetation, thus completing a totally regenerative ecological design cycle.

If one realizes that the universe is sum-totally an evolutionary design integrity, then one may be prone to acknowledge that an a priori intellect of infinitely vast considerateness and competence is everywhere and everywhen overwhelmingly manifest.

In view of a number of discoveries such as the ecological regeneration manifest in the mammalian-vegetation interexchange of gases, we can comprehend why responsibly thinking humans have time and again throughout the ages come to acknowledge a supra-human omniscience and omnipotence.

The self-regenerative scenario universe is an a priori design integrity. The universe is everywhere, and continually, manifesting an intellectual integrity which inherently comprehends all macro-micro event patterning and how to employ that information objectively with omni-consideration of all inter-effects and reactions. The universe manifests an extraordinary aggregate of generalized principles, none of which contradict one another and all of which are inter-accommodative, with some of the inter-accommodations exhibiting high exponential levels of synergetic surprise. Some of them involve fourth-power geometrical levels of energy interactions.

In addition to being a sailor, I am a mechanic. I carry a Journeyman's card in the International Association of Machinists and Aerospace Workers. I know how to operate all kinds of machine tools. I can always take a job in a machine shop, on a lathe, or work in a sheet metal shop on a stretch-press, press brake, et al. But I also have a wide experience in mass production tooling and in the general economics of the mass production concept. I understand the principle of tools that make tools.

As a youth on an island in Maine, I started designing spontaneously. I didn't draw something on paper and ask a carpenter to build it for me. I executed my own designing. I often had to make my own tools and procure my materials directly from the landscape. I would go into the woods and cut my own trees, dress them out, cure them, and then fashion them into their use form. I'm experienced in going from original conceptions, i.e., inventions—*ergo* unknown to others—to altering the environment in a complex of ways which are omni-considerate of all side effects on the altered environment. I am accustomed to starting from primitive conditions, where as far as one can see no other man has explored. I have learned how to rearrange the environment in such a way that it does various things for our society that we could not do before, such as building a dam which in turn

produces a pond. I have been around for a half century to check on the adequacy of my earlier ecological considerations and their subsequent environmental intereffects. No deleterious results are in evidence.

Because of that kind of experience, I am preoccupied with complex technology and all its social, industrial, economical, ecological, and physiological involvements. Industry involves all kinds of metallic alloys and plastics. I am interested not only in the chemistries but also in the tools necessary to accommodate the electrochemistry and metallurgy.

How does one take the prime design initiative—coping with all directly or indirectly related factors, from beginning to end of the problem? One must acquire mathematical knowledge and facility. When I'm building an airplane, I must know how to calculate the strength of its parts and their synergetic interaction in general assemblies and how to design their dynamic and static loading tests and how thereby to verify the theoretical calculations. I must understand the Bernoulli principles and Poisson's Law and whatever other general laws may be relevant. I must be competently familiar with all the civil and economic involvements of the aircraft use and maintenance, etc.

In the aircraft industry, for many years, the lead design teams were staffed with M.A. or Ph.D. engineers. Well developed in theory, these top engineers designed the airplanes and their many detailed parts. To get a little idea of the relative complexity involved, we note that ordinary single-family dwellings have about 500 types of parts. In respect to each type of part, there are usually a large number of mass-reproduced replicas of any one prototype part—such, for instance, as thousands of replicas of one type of finishing nail or multi-thousands of one type of brick. Automobiles involve an average of 5,000 types of parts and airplanes often involve 25,000 or more types of parts.

The lead-design-team calculations of aeronautical engineers embrace the stress and service behaviors of the finally assembled interactions of all the sub-assem-

blies of those parts as well as of the parts themselves. In the production and assembly of their end-products in single-family dwellings, automobiles, and airplane productions, the average deviation of finally assembled dimensions from the originally specified dimensions of their designers are plus or minus a quarter of an inch in dwellings—plus or minus a one-thousandth of an inch in automobiles—plus or minus one ten-thousandth of an inch in airplanes.

World War II was history's first war in which superior air power was the turning factor. Airplane production was inaugurated at an unprecedented magnitude. When in 1942 the U.S.A. came to designing and manufacturing multi-thousands of airplanes, it often developed that the design team engineers knew nothing about production methods and materials, as for instance they didn't realize that the aluminum alloy they specified came in certain standard production sizes with which they were unfamiliar. Time and again, during World War II, empty freight cars by the thousands were routed to aircraft companies to take away the ill-informed design engineers' waste scrap. More than half of all the tonnage of aluminum delivered to U.S. aircraft plants during World War II was carried away from those plants as scrap. The design engineers specified cutting the heart out of a sheet of metal for their special product and throwing away the two-thirds remainder because their theoretical studies showed an unreliability of rolled sheet along the sheets' edges. As a consequence, a separate corps of production engineers with the same theoretical competence as the designing engineers, but also deeply conversant with production practices as well as with the evolutionary frontier of newly available production tools, had to completely rework the original airplane-part designs to obtain equal strength and optimum end-performance but also suitability to available tool produceability. Production engineering involves "reserving tool time to make tools." There's a long forward scheduling. It takes much experience in the

field of production to lay out the plant flow and tool set-up.

Then the comprehensive production engineer must understand the work of the men who make tools. The toolmaking constitutes an extraordinary phase of industrial evolution whether in Detroit's auto production or anywhere in the aircraft production world. The toolmakers are the invisible, almost magical, "seven dwarfs" of industrial mass production. When the production engineer finds that no standard tool exists which can do such-and-such an essential job, then a good toolmaker and a good production engineer say, "Yes, sir, we must evolve a tool to do so and so," and so they do—thousands after thousands of times, and thus humanity's degree of freedom increases, and its days of life are multiplied.

What is an impact extrusion? It is a vase-like receptacle with a belly at its bottom and a narrow neck. You can take clay and ram it in, bit by bit, through the top and narrow neck. Finally you fill the whole bottom and then the neck above it. An impact extrusion takes aluminum, for instance, and squeezes it into such a vase-like vessel while periodically impacting it violently to spread it outward at its base. After forming, the vase-like vessel opens, in separate vertical parts, to free the completed and contained part. This is a typical operation of production engineering. Production engineers have to know how to heat-treat and anneal their parts and whether various alloyed metals can stand reworking, punching, drawing, and how far they can transform before the material breaks apart (crystallizes) and whether further heat-treating may make further transforming possible. Production engineering calls for an artist-scientist-inventor with enormous experience.

When complex assemblies are finally produced, the comprehensive designer must know how to get them to wherever they need to go. He may need to put his products in wooden crates so they can be

moved safely from "here to there," and he has to know what the freight regulations are, etc.

In my early days in New York before World War I, there were relatively few automobiles and no motor trucks. There were a few very small electric vans. Trucking was done primarily by horses and drays. The men driving horses were pretty good at their driving. They were usually illiterate and often drunk. Bringing up his dray with or without helper, the driver was interested only in getting his rig loaded or unloaded. This didn't call for intellectual talent, and it didn't call for anybody interested in the product. The drivers and luggers were just moving this and that from here to there. I saw trucks being loaded and unloaded wham-bam; anything would do. The truckers and luggers didn't know what was inside the packages, so they just piled them here or there as their fancy pleased. Sometimes the loads would slide off the dray.

New York was full of little manufactories that needed products delivered. I guess that 25 per cent of everything that went on any truck in those days was destined to ruin. There was an assumption on the part of the manufacturer and the people receiving the goods that 25 per cent of everything received would be destroyed in handling. The idea of packing products in corrugated cardboard cartons, as we do today, had not yet evolved. The then existent cardboard boxes were poorly designed and often broke open. In order to be sure that expensive things didn't get hurt, merchants put them in very heavy and expensive wooden crating. They tried to make their crating indestructible. If the load fell off a truck, they hoped it wasn't going to get hurt. The engineers who were shipping on ocean steamships designed special ocean steamship crating calculated to withstand handling in great nets elevated by enormous booms which swung the loads aboard and banged them down into the hold. Often these crates and loaded slings would crash against the ship's side. Insurance companies began to give rebates or pre-

miums to clients who designed better cases. Thus the container business began to thrive. After World War II came the foam-formed packaging. Since then, television sets, cameras, et al. have been neatly packed in shock-proof plastic pre-forms.

During World War II, many enormous, partly completed airplane sub-assemblies had to be moved from here to there. These parts were very valuable. To make crates large and strong enough for these parts was formidably difficult. The comprehensive engineers built special trucks to do one single task. Inside these trucks, they installed special jigs that would securely hold a particular product. This was called jig-shipping. The uncrated products were bolted safely in place.

Out of the jig-shipping developed the design of standard railway boxcar or trailer truck containers which could contain jig-shipping fixtures and could be loaded interchangeably onto railway flatcars, onto trailer wheels, or onto specially designed ocean-going ships devoted exclusively to container shipping. Comprehensive Anticipatory Design Science embraces the foregoing design-evolution initiatives. It must be responsible all the way from the geographical points at which the raw resources occur in nature, and that means in remote places all around the world. Comprehensive Anticipatory Design Science must be responsible for designing every process all through the separating, mining, refining stages and their subsequent association into alloys, and subsequent forming into products. Comprehensive Anticipatory Design Science must learn how you go from ingots into rolled sheet and to convert the latter into the next form. The Comprehensive Anticipatory Design Scientist knows that forming steel into the intermediate merchandising forms of tubes, angles, I-beams, sheet and plate can often be avoided, if the metals are produced originally by their end-user.

World War I saw the beginning of industrially produced alloys. World War II employed an enormous variety of steel and aluminum alloys. To accommo-

date the multiplicity of design requirements, the steel and aluminum manufacturers formed angles, channels, I-beams, T's, Z's, in a vast assortment of sizes and alloys. This meant that the aircraft plant was stocked with full bins of all kinds of sections of different sizes and alloys of metals all color-coded. These alloys did not exist in World War I. There was mild steel and piano wire steel and a few others. World War II saw so many different kinds of steels and aluminum developed that were designated by decimal code numbers whose types ran into the thousands. All kinds of complex color-band codes were also used for special classes of material. The aircraft plant bins were full of a vast variety of rods, bars, angles, channels, hat-sections, et al. As parts were cut out of these stocks, there was waste. Because manufacturers of original metal stock had to have standard sizes, the aircraft producers had to cut big parts into little parts from one kind of section or another.

As a consequence of all that waste and duplicated effort, after World War II the aircraft industry production techniques began to change rapidly. Donald Douglas, founder and pioneer of the DC–3 and its "DC–" descendants, said, "I'm never again going to have a design engineer who isn't also a production engineer. We must eliminate these two stages." Another factor that induced method changes was that complex alloying began to increase even more rapidly after World War II. The computer made it possible to cope with more complex problems. Aerospace research brought about new knowledge which resulted in unprecedented advances in alloys. To produce the new jets or rockets, metals were needed with strength and heat-resistance capabilities not as yet known to exist. Therefore, metals had to be developed which could withstand the re-entry heats and structural stresses of rocket capsules returning into the atmosphere which generated fantastic degrees of heat as they rushed back into the air at thousands of miles per hour. Metals had to be strong enough to hold the capsule together.

Thus a new industrial production era began in which the designing engineer said, "We're going to have to have such-and-such a capability metal which is not as yet known to exist." So for the first time in history, metallurgists aided by computers were able to produce enough knowledge regarding nature's fundamental associabilities and disassociabilities to be able to design new, unprecedented metals. That was strictly a post–World War II event.

Up to this moment research scientists had from time to time made discoveries of new alloys—their discoveries could not be predicted. At mid-twentieth century, 1950, humans began to design specific metals for specific functions to be produced in the exact amounts and formed instantly in the final use shape. Thus a truly new phase of comprehensive design began wherein a pre-specified, unprecedented metal was produced immediately in its ultimate use shape. The airspace production no longer had to go through the intermediary phases of finding the nearest type of special alloy, and the special "dimension" angle, or Z-bar, which must then go to the machine shop for special cutting and further forming. The swift evolutions in design strategy are not even taught in the engineering schools, for the airspace technology is often "classified," and the engineering school professors had no way of learning about the changes.

At M.I.T. there are buildings full of rooms, and rooms full of yesterday's top priority machinery that is now utterly obsolete. They have a vast graveyard of technology. The students don't want to take classes in mechanical engineering any more because they have heard that what they learn is going to be obsolete before they graduate. These evolutionary events cover all phases of technology and the physical sciences. Victor Papanek's book conducts a mass funeral service for a whole segment of now obsolete professionals.

These now swiftly accelerating events in the design and production competence of humanity with which the Comprehensive Anticipatory Design Scien-

tist is concerned are symptomatic of far greater evolutionary transformations in the life of humanity aboard our planet.

We are transforming from a five-and-one-half-million-year period of humanity isolated in small tribes scattered so far apart as to have no knowledge of one another. At the tail-end of that period there developed a ten-thousand-year period in which humans built fortified citadels and a few fortified cities commanding scarce and rich farming areas—all of which were as yet so remote from one another that existence of other such city-states was only legendary hear-say to the dwellers within any one such city. Once in a decade or century, droughts, floods, fires, pestilence, and other disasters in one such city-state sent its inhabitants migrating away seeking new lands to support them. Great wars occurred as they discovered and invaded the cultivated lands of others. Halfway through that last ten thousand years of history, which opened with the city-states, the evolution from grass-and-pitch boats, inflated pigskin floats, log rafts and dugouts developed into powerful, keeled and ribbed, deep-bellied vessels which attained high-seas-keeping capability and with celestial navigation attained the competence to traverse the great oceans with cargoes vaster than could be carried overland on the backs of animals. Water covers three quarters of the Earth, whose three seemingly separate oceans are only joined together, free of ice, around the Antarctic continent many thousands of miles away from the 95 per cent of humanity living in the northern lands of our planet.

With this discovery that all the oceans were interconnected, there began the integratability of world-around resources whose alloyable associabilities generate ever higher physical advantage for ever greater numbers of humanity and give rise to the phenomenon industrialization. Industrialization is the integration of all the known history of experiences of all of humanity resolved into scientific principles which enable the doing of ever more comprehensively adequate tasks

with ever less investment of human time, kilowatts of power, and pounds of material per each accomplished function, accomplished primarily from energies other than those impounded by today's or yesterday's vegetation-capture of Sun energy.

The last five hundred years of humanity aboard our planet have witnessed the at first gradual and now ever swifter development of world-embracing industrialization. Early regeneration of human life aboard our planet was sustained exclusively by the a priori vegetation, fish, and land animal flesh. These foods were hunted, hand-picked, or hand-cultivated. Then came irrigation, and after World War I, mechanization of farming tools and vehicles such as the plows, autos, and reapers which involved taking the fossil fuels from nature's terrestrial storage battery, to start and keep their engines moving. In the last one hundred years electromagnetics and production steel have permitted man to harness some of the limitless, eternally transforming energy of the universe's main engines. What is going on is analogous to using the storage battery to actuate our self-starter to get us hooked up with the inexhaustible main engine of the universe which will quite incidentally recharge the Earth's fossil-fuel storage battery. In the last fifty years we have started to establish a world-around integratable energy-distributing network which will soon be switched into the inexhaustible celestial energy system of the infinitely regenerative universe.

To fulfill his potential usefulness to humanity, the Comprehensive Anticipatory Design Scientist must multiply his numbers to permit the conversion of humanity from a you-or-me ignorance status to the omni-successful education and sustenance of all humanity. That omni-success has now become technically feasible, but is frustrated by humanity's clinging ignorantly to the inherently shortsighted one-year accounting system which was suitable only to yesterday's life support which was entirely dependent upon "this year's" perishable crop of Sun energy which was then exclusively

impounded by land-borne vegetation and water-borne algae.

Now we have available the inexhaustible, gravitationally generated, tidal power of the world ocean to feed into our soon-to-be-accomplished world-around electromagnetic power network to be fed also by wind and direct Sun.

No longer is it valid to say, "We can't afford to spend," which concept was fundamentally generated by the truly expendable, because highly perishable, easily exhaustible, exclusively biological impoundment of Sun energy. Now we are throwing the switch to connect humanity into the universe's eternally self-regenerative system. This brings with it the ability to say we have attained unlimited ability to regenerate local life aboard our planet and within its ever expanding celestial neighborhood. Designing the new accounting system is the task of the Comprehensive Anticipatory Design Scientist. The new economic accounting system must make it eminently clear that whatever we need to do, that we know how to do, we can afford to do.

It is the growing pains of this epochal transition which give rise to the conditions with which Victor Papanek deals so effectively in this book. He is lowering the asbestos curtain on the historical scene of an Earth-bound humanity universally frustrated by the last days of omni-specialization. Omni-specialization by the educational system was yesterday's physical tyrants' means of effecting their omni-divide-and-conquer strategy. If humanity is to survive aboard our planet, it must become universally literate and preoccupied with inherently cooperative Comprehensive Anticipatory Design Science in which every human is concerned with accomplishing the comfortably sustainable well-faring of all other humans.

R. Buckminster Fuller

Carbondale, Illinois

PREFACE

There are professions more harmful than industrial design, but only a very few of them. And possibly only one profession is phonier. Advertising design, in persuading people to buy things they don't need, with money they don't have, in order to impress others who don't care, is probably the phoniest field in existence today. Industrial design, by concocting the tawdry idiocies hawked by advertisers, comes a close second. Never before in history have grown men sat down and seriously designed electric hairbrushes, rhinestone-covered file boxes, and mink carpeting for bathrooms, and then drawn up elaborate plans to make and sell these gadgets to millions of people. Before (in the "good old days"), if a person liked killing people, he had to become a general, purchase a coal mine, or else study nuclear physics. Today, industrial design has put murder on a mass production basis. By designing criminally unsafe automobiles that kill or maim nearly one million people around the world each year, by creating whole new species of permanent garbage to clutter up the landscape, and by choosing materials and processes that pollute the air we breathe, designers have become a dangerous breed. And the skills needed in these activities are taught carefully to young people.

In an age of mass production when everything must be planned and designed, design has become the most powerful tool with which man shapes his tools and environments (and, by extension, society and himself). This demands high social and moral responsibility from the designer. It also demands greater understanding of the people by those who practice design and more insight into the design process by the public. Not a single volume on the responsibility of the designer, no book on design that considers the public in this way, has ever been published anywhere.

In February of 1968, *Fortune* magazine published

an article that foretold the end of the industrial design profession. Predictably, designers reacted with scorn and alarm. But I feel that the main arguments of the *Fortune* article are valid. It is about time that industrial design, *as we have come to know it*, should cease to exist. As long as design concerns itself with confecting trivial "toys for adults," killing machines with gleaming tailfins, and "sexed-up" shrouds for typewriters, toasters, telephones, and computers, it has lost all reason to exist.

Design must be an innovative, highly creative, cross-disciplinary tool responsive to the true needs of men. It must be more research-oriented, and we must stop defiling the earth itself with poorly-designed objects and structures.

For the last ten years or so, I have worked with designers and student design teams in many parts of the world. Whether on an island in Finland, in a village school in Indonesia, an air-conditioned office overlooking Tokyo, a small fishing village in Norway, or where I teach in the United States, I have tried to give a clear picture of what it means to design within a social context. But there is only so much one can say and do, and even in Marshall McLuhan's electronic era, sooner or later one must fall back on the printed word.

Included in the enormous amount of literature we have about design are hundreds of "how-to-do-it" books that address themselves exclusively to an audience of other designers or (with the gleam of textbook sales in the author's eye) to students. The social context of design, as well as the public and lay reader, is damned by omission.

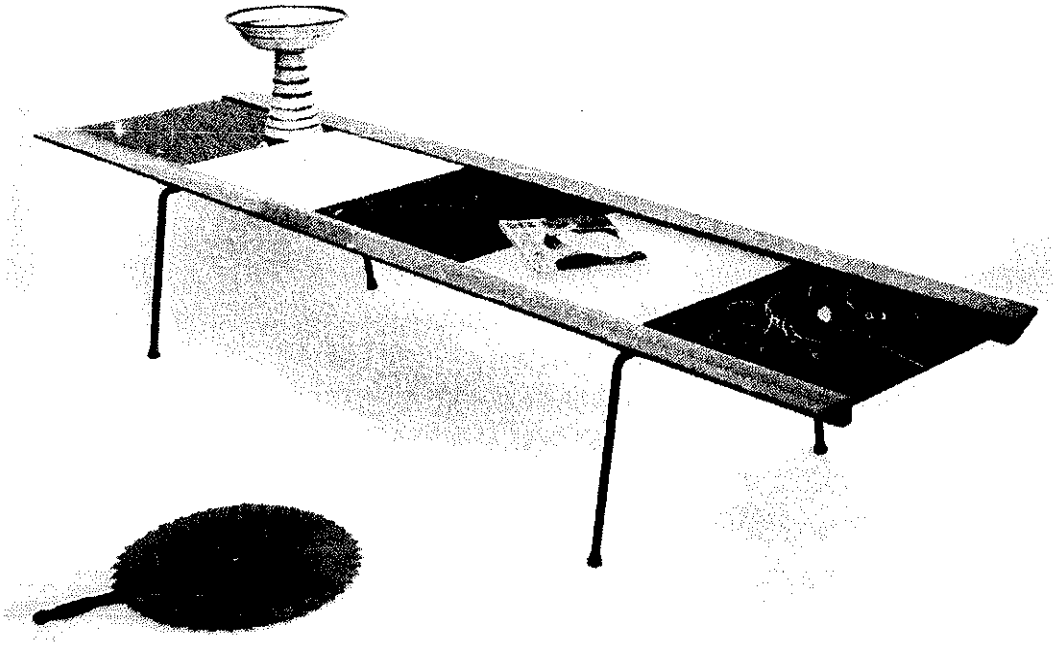
Looking at the books on design in seven languages, covering the walls of my home, I realized that the one book I wanted to read, the one book I most wanted to hand to my fellow students and designers, was missing. Because our society makes it crucial for designers to understand clearly the social, economic, and political background of what they do, my problem was

not just one of personal frustration. So I decided to write the kind of book that I'd like to read.

This book is written from the viewpoint that there is something basically wrong with the whole concept of patents and copyrights. If I design a toy that provides therapeutic exercise for handicapped children, then I think it is unjust to delay the release of the design by a year and a half, going through a patent application. I feel that ideas are plentiful and cheap, and it is wrong to make money off the needs of others. I have been very lucky in persuading many of my students to accept this view. Much of what you will find as design examples throughout this book has never been patented. In fact, quite the opposite strategy prevails: in many cases students and I have made measured drawings of, say, a play environment for blind children, written a description of how to build it simply, and then mimeographed drawings and all. If any agency, anywhere, will write in, my students will send them all the instructions free of charge. I try to do the same myself. An actual case history may explain this principle better.

Shortly after leaving school nearly two decades ago, I designed a coffee table based on entirely new concepts of structure and assembly. I gave a photograph and drawings of the table to the magazine *Sunset*, which printed it as a do-it-yourself project in the February, 1953, issue. Almost at once a Southern California furniture firm, Modern Color, Inc., "ripped-off" the design and went into production. Admittedly they sold about eight thousand tables in 1953. But now it is 1970. Modern Color has long since gone bankrupt, but *Sunset* recently reprinted the design in their book *Furniture You Can Build*, so people are still building the table for themselves.

Thomas Jefferson himself entertained grave doubts as to the philosophy inherent in a patent grant. At the time of his invention of the hemp-break, he took positive steps to prevent being granted a patent and wrote to a friend: "Something of this kind has been



"Transite Table," author's design, courtesy: *Sunset* magazine.

so long wanted by cultivators of hemp that as soon as I can speak of its effect with certainty, I shall probably describe it anonymously in the public papers in order to forestall the prevention of its use by some interloping patentee."

I hope this book will bring new thinking to the design process and start an intelligent dialogue between designer and consumer. It is organized into two parts, each six chapters long. The first part, "Like It Is," attempts to define and criticize design as it is practiced and taught today. The six chapters of "How It Could Be" give the reader at least *one* newer way of looking at things in each chapter.

I have received inspiration and help in many parts of the world, over many years, in forming the ideas and ideals that made the writing of this book so necessary. I have spent large chunks of time living among Navahos, Eskimos, and Balinese, as well as spending

nearly one third of each of the last seven years in Finland and Sweden, and I feel that this has shaped my thoughts.

In Chapter Four, "Do-It-Yourself Murder," I am indebted to the late Dr. Robert Lindner of Baltimore, with whom I corresponded for a number of years, for his concept of the "Triad of Limitations." The idea of *kymmenykset* was first formulated by me during a design conference on the island of Suomenlinna in Finland in 1968. The word *Ujamaa*, as a simple way of saying "we work together and help each other without colonialism or neo-colonial exploitation," was supplied in Africa during my UNESCO work.

Mr. Harry M. Philo, an attorney from Detroit, is responsible for many of the examples of unsafe design cited in Chapter Five.

Much in Chapter Eleven, "The Neon Blackboard," reflects similar thinking by my two good friends Bob Malone of Connecticut and Bucky Fuller.

Four people are entitled to special thanks. Walter Muhonen of Costa Mesa, California, because the example set by his life has kept me going, even though my goals seemed unattainable. He taught me the real meaning of the Finnish word *sisu*. Patrick Decker of College Station, Texas, for persuading me to write this book. "Pelle" Olof Johansson of Halmstad and Stockholm, Sweden, for arguing the fine points of design with me, long into many nights; and for making the actual completion of this book's first Swedish edition possible. My wife, Harlanne, helped me to write what I wanted to say, instead of writing what seemed to sound good. Her searching questions, criticism, and encouragement often made all the difference.

The incisive thinking and the help of my editor, Verne Moberg, have made this revised edition sounder and more direct.

In an environment that is screwed up visually, physically, and chemically, the best and simplest thing that architects, industrial designers, planners, etc.,

could do for humanity would be *to stop working entirely*. In all pollution, designers are implicated at least partially. But in this book I take a more affirmative view: It seems to me that we can go beyond not working at all, and work positively. Design can and must become a way in which young people can participate in changing society.

Ever since the German Bauhaus first published its fourteen slender volumes around 1924, most books have merely repeated the methods evolved there or added frills to them. A philosophy more than half a century old is out of place in a field that must be as forward-looking as this.

As socially and morally involved designers, we must address ourselves to the needs of a world with its back to the wall while the hands on the clock point perpetually to one minute before twelve.

Helsinki—Singaradja (Bali)—Stockholm

1963–1971

PART ONE

LIKE IT IS

1 WHAT IS DESIGN?

A Definition of Design and the Function Complex

The wheel's hub holds thirty spokes
Utility depends on the hole through the hub.
The potter's clay forms a vessel
It is the space within that serves.
A house is built with solid walls
The nothingness of window and door alone renders it useable,
That which exists may be transformed
What is non-existent has boundless uses.
—LAO-TSE

All men are designers. All that we do, almost all the time, is design, for design is basic to all human activity. The planning and patterning of any act towards a desired, foreseeable end constitutes the design process. Any attempt to separate design, to make it a thing-by-itself, works counter to the inherent value of design as the primary underlying matrix of life. Design is composing an epic poem, executing a mural, painting a masterpiece, writing a concerto. But design is also cleaning and reorganizing a desk drawer, pulling an impacted tooth, baking an apple pie, choosing sides for a back-lot baseball game, and educating a child.

Design is the conscious effort to impose meaningful order.

The order and delight we find in frost flowers on a window pane, in the hexagonal perfection of a honeycomb, in leaves, or in the architecture of a rose, reflect man's preoccupation with pattern, the constant attempt to understand an ever-changing, highly complex existence by imposing order on it—but these things are not

the product of design. They possess only the order we ascribe to them. The reason we enjoy these and other things in nature is that we see an economy of means, simplicity, elegance, and an essential rightness in them. But they are not design. Though they have pattern, order, and beauty, they lack conscious intention. If we call them design, we artificially ascribe our own values to an accidental side issue. The streamlining of a trout's body is aesthetically satisfying to us, but to the trout it is a by-product of swimming efficiency. The aesthetically satisfying spiral growth pattern found in sunflowers, pineapples, pine cones, or the arrangement of leaves on a stem can be explained by the Fibonacci sequence (each member is the sum of the two previous members: 1, 1, 2, 3, 5, 8, 13, 21, 34 . . .), but the plant is only concerned with improving photosynthesis by exposing a maximum of its surface. Similarly, the beauty we find in the tail of a peacock, although no doubt even more attractive to a peahen, is the result of intraspecific selection (which, in the case cited, may even ultimately prove fatal to the species).

Intent is also missing from the random order system of a pile of coins. If, however, we move the coins around and arrange them according to size and shape, we add the element of intent and produce some sort of symmetrical alignment. This symmetrical order system is a favorite of small children, unusually primitive peoples, and some of the insane, because it is so easy to understand. Further shifting of the coins will produce an infinite number of asymmetrical arrangements which require a higher level of sophistication and greater participation on the part of the viewer to be understood and appreciated. While the aesthetic values of the symmetrical and asymmetrical designs differ, both can give ready satisfaction since the underlying intent is clear. Only marginal patterns (those lying in the threshold area between symmetry and asymmetry) fail to make the designer's intent clear. The ambiguity of these "threshold cases" produces a feeling of unease

in the viewer. But apart from these threshold cases there are an infinite number of possible satisfactory arrangements of the coins. Importantly, none of these is the one right answer, though some may seem better than others.

Shoving coins around on a board is a design act in miniature because design as a problem-solving activity can never, by definition, yield the one right answer: it will always produce an infinite number of answers, some "righter" and some "wronger." The "rightness" of any design solution will depend on the meaning with which we invest the arrangement.

Design must be meaningful. And "meaningful" replaces the semantically loaded noise of such expressions as "beautiful," "ugly," "cool," "cute," "disgusting," "realistic," "obscure," "abstract," and "nice," labels convenient to a bankrupt mind when confronted by Picasso's "Guernica," Frank Lloyd Wright's Fallingwater, Beethoven's *Eroica*, Stravinsky's *Le Sacre du printemps*, Joyce's *Finnegans Wake*. In all of these we respond to that which has meaning.

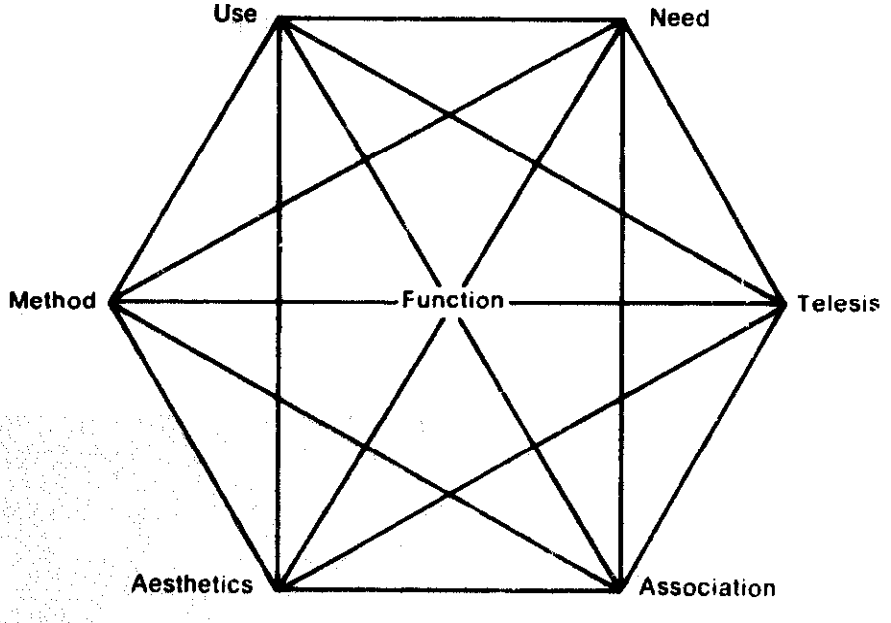
The mode of action by which a design fulfills its purpose is its function.

"Form follows function," Louis Sullivan's battle cry of the 1880's and 1890's, was followed by Frank Lloyd Wright's "Form and function are one." But semantically, all the statements from Horatio Greenough to the German Bauhaus are meaningless. The concept that what *works* well will of necessity *look* well, has been the lame excuse for all the sterile, operating-room-like furniture and implements of the twenties and thirties. A dining table of the period might have a top, well proportioned in glistening white marble, the legs carefully nurtured for maximum strength with minimum materials in gleaming stainless steel. And the first reaction on encountering such a table is to lie down on it and have your appendix extracted. Nothing about the table says: "Dine off me." *Le style international* and *die neue Sachlichkeit* have let us down rather badly in terms of human value. Le

Corbusier's house as *la machine à habiter* and the packing-crate houses evolved in the Dutch *De Stijl* movement reflect a perversion of aesthetics and utility.

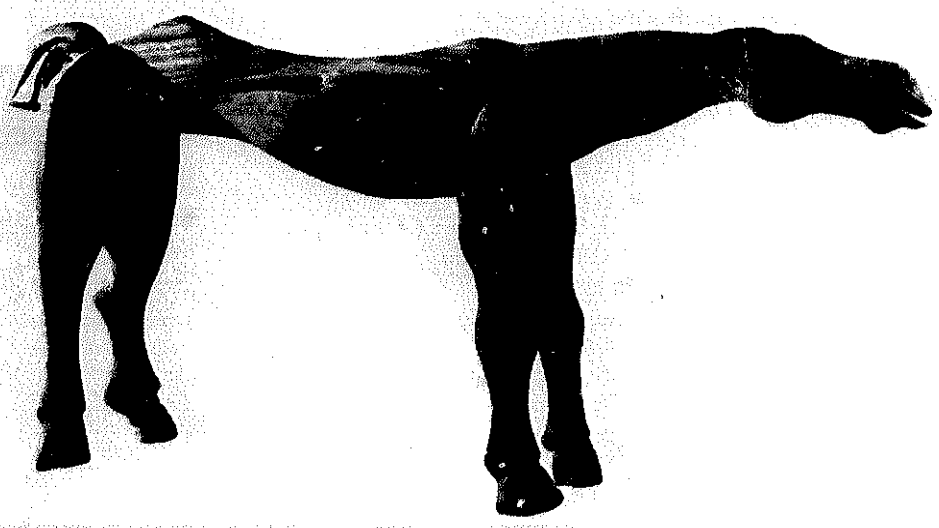
"Should I design it to be functional," the students say, "or to be aesthetically pleasing?" This is the most heard, the most understandable, and the most mixed-up question in design today. "Do you want it to look good, or to work?" Barricades erected between what are really just two of the many aspects of function. It is all quite simple: aesthetic value is an inherent *part* of function. A simple diagram will show the dynamic actions and relationships that make up the function complex:

Figure: 1 THE FUNCTION COMPLEX



It is now possible to go through the six parts of the function complex (above) and to define every one of its aspects.

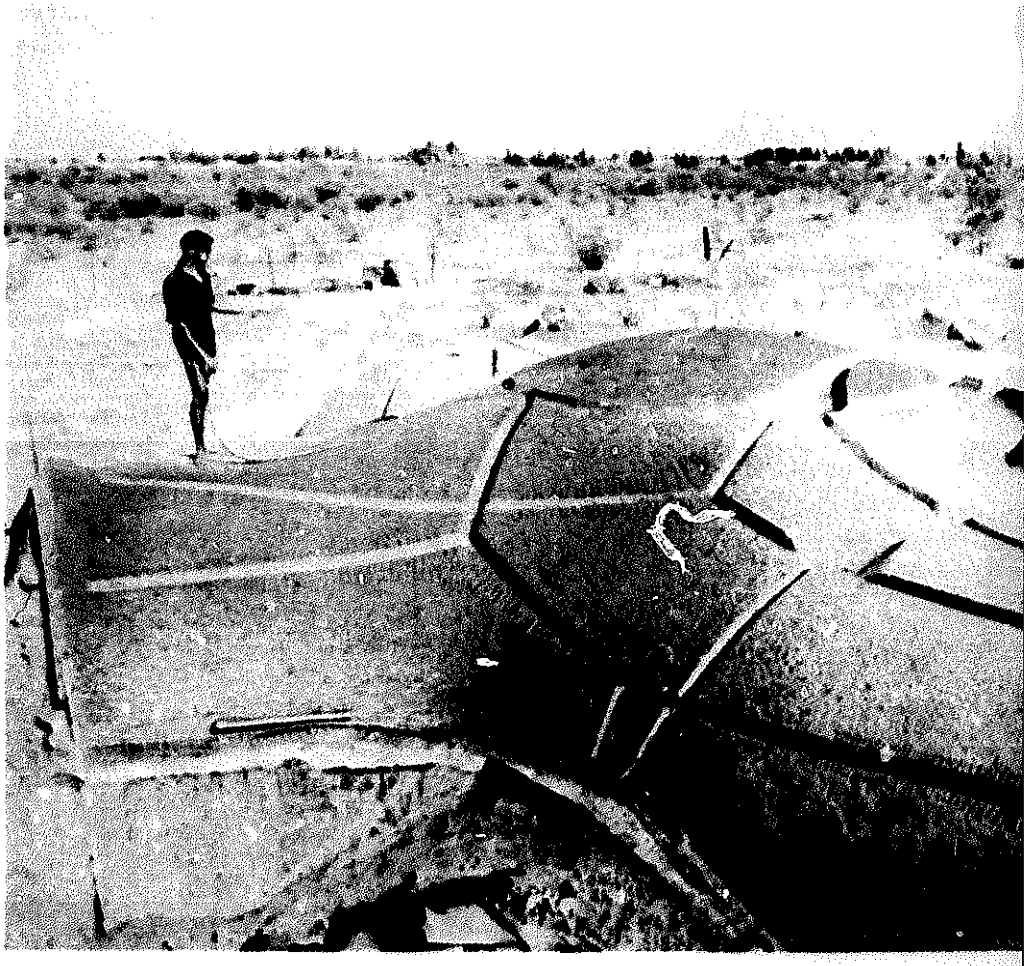
METHOD: The interaction of *tools*, *processes*, and *materials*. An honest use of materials, never making the material seem that which it is not, is good method. Materials and tools must be used optimally, never using one material where another can do the job less expensively and/or more efficiently. The steel beam in a house, painted a fake wood grain; the molded plastic bottle designed to look like expensive blown glass; the 1967 New England cobbler's bench reproduction ("worm holes $1 extra") dragged into a twentieth-century living room to provide dubious footing for martini glass and ash tray: these are all perversions of materials, tools, and processes. And this discipline of



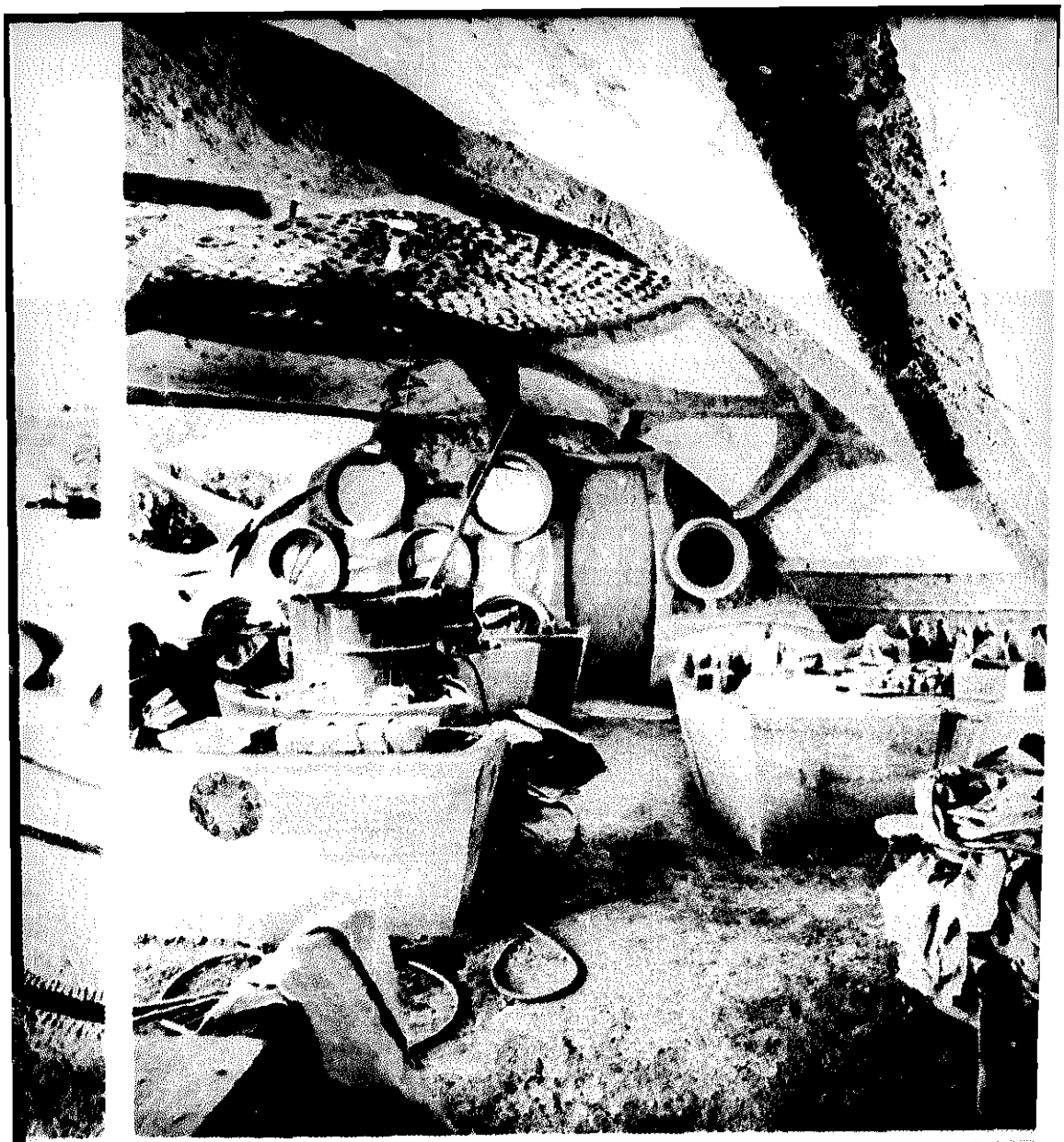
Alexander Calder: "The Horse" (1928). Walnut, 15½ x 34¾. Collection The Museum of Modern Art, New York. Acquired through the Lillie P. Bliss Bequest.

using a suitable method extends naturally to the field of the fine arts as well. Alexander Calder's "The Horse," a compelling sculpture at the Museum of Modern Art in New York, was shaped by the particular material in which it was conceived. Calder decided that boxwood would give him the specific color and texture

Paolo Soleri: Carved earth form for the original drafting room and interior of the ceramics workshop. Photos by Stuart Weiner.



he desired in his sculpture. But boxwood comes only in rather narrow planks of small sizes. (It is for this reason that it traditionally has been used in the making of small boxes: hence its name.) The only way he could make a fair-sized piece of sculpture out of a wood that only comes in small pieces was to interlock them somewhat in the manner of a child's toy. "The Horse," then, is a piece of sculpture, the aesthetic of which was largely determined by method. For the final execution at the Museum of Modern Art Calder chose to use thin slats of walnut, a wood similar in texture.



When early Swedish settlers in what is now Delaware decided to build, they had at their disposal trees and axes. The *material* was a round tree trunk, the *tool* an ax, and the *process* a simple kerf cut into the log. The inevitable result of this combination of tools, materials, and process is a log cabin.

From the log cabin in the Delaware Valley of 1680 to Paolo Soleri's desert home in twentieth-century Arizona is no jump at all. Soleri's house is as much the inevitable result of tools, materials, and processes as is the log cabin. The peculiar viscosity of

the desert sand where Soleri built his home made his unique method possible. Selecting a mound of desert sand, Soleri criss-crossed it with V-shaped channels cut into the sand, making a pattern somewhat like the ribs of a whale. Then he poured concrete in the channels, forming, when set, the roof-beams of the house-to-be. He added a concrete skin for the roof and bulldozed the sand out from underneath to create the living space itself. He then completed the structure by setting in car windows garnered from automobile junkyards. Soleri's creative use of tools, materials, and processes was a *tour de force* that gave us a radically new building method.

Dow Chemical's "self-generating" styrofoam dome is the product of another radical approach to building methods. The foundation of the building can be a 12-inch-high circular retaining wall. To this wall a 4-inch-wide strip of styrofoam is attached, which raises as it goes around the wall from zero to 4 inches in height, forming the base for the spiral dome. On the ground in the center, motorized equipment operates two spinning booms, one with an operator and the other holding a welding machine. The booms move around, somewhat like a compass drawing a circle, and they rise with a spiraling motion at about 30 feet a minute. Gradually they move in towards the center. A man sitting in the saddle feeds an "endless" 4 x 4-inch strip of styrofoam into the welding machine, which heat-welds it to the previously hand-laid styrofoam. As the feeding mechanism follows its circular, rising, but ever-diminishing diameter path, this spiral process creates the dome. Finally, a hole 36 inches in diameter is left in the top, through which man, mast, and moment arm can be removed. The hole is then closed with a clear plastic pop-in bubble or a vent. At this point the structure is translucent, soft, but still entirely without doors or windows. The doors and windows are then cut (with a minimum of effort; in fact the structure is still so soft that openings could be cut with one's fingernail), and the structure is sprayed inside

and out with latex-modified concrete. The dome is ultra-lightweight, is secured to withstand high wind speeds and great snow loads, is vermin-proof, and inexpensive. Several of these 54-foot-diameter domes can be easily joined together into a cluster.

All these building methods demonstrate the elegance of solution possible with a creative interaction of tools, materials, and processes.

USE: "Does it work?" A vitamin bottle should dispense pills singly. An ink bottle should not tip over. A plastic-film package covering sliced pastrami should withstand boiling water. As in any reasonably conducted home, alarm clocks seldom travel through the air at speeds approaching five hundred miles per hour, "streamlining" clocks is out of place. Will a cigarette lighter designed like the tailfin of an automobile (the design of that automobile was copied from a pursuit plane of the Korean War) give more efficient service? Look at some hammers: they are all different in weight, material, and form. The sculptor's mallet is fully round, permitting constant rotation in the hand. The jeweler's chasing hammer is a precision instrument used for fine work on metal. The prospector's pick is delicately balanced to add to the swing of his arm when cracking rocks.

The ball-point pen with a fake polyethylene orchid surrounded by fake styrene carrot leaves sprouting out of its top, on the other hand, is a tawdry perversion of design for use.

But the results of the introduction of a new device are never predictable. In the case of the automobile, a fine irony developed. One of the earliest criticisms of the car was that, unlike "old Dobbin," it didn't have the sense "to find its way home" whenever its owner was incapacitated by an evening of genteel drinking. No one foresaw that mass acceptance of the car would put the American bedroom on wheels, offering everyone a new place to copulate (and privacy from supervision by parents and spouses). Nobody expected the

car to accelerate our mobility, thereby creating the exurban sprawl and the dormitory suburbs that strangle our larger cities; or to sanction the killing of fifty thousand people per annum, brutalizing us and making it possible, as Philip Wylie says, "to see babies with their jaws ripped off on the corner of Maine and Maple"; or to dislocate our societal groupings, thus contributing to our alienation; and to put every yut, yahoo, and prickamouse from sixteen to sixty in permanent hock to the tune of $80 a month. In the middle forties, no one foresaw that, with the primary use function of the automobile solved, it would emerge as a combination status symbol and disposable, chrome-plated codpiece. But two greater ironies were to follow. In the early sixties, when people began to fly more, and to rent standard cars at their destination, the businessman's clients no longer saw the car he owned and therefore could not judge his "style of life" by it. Most of Detroit's baroque exuberance subsided, and the automobile again came closer to being a transportation device. Money earmarked for status demonstration was now spent on boats, color television sets, and other ephemera. The last irony is still to come: with carbon monoxide fumes poisoning our atmosphere, the electric car, driven at low speeds and with a cruising range of less than one hundred miles, reminiscent of the turn of the century, may soon make an anachronistic comeback. Anachronistic because the days of individual transportation devices are numbered.

The automobile gives us a typical case history of seventy years of the perversion of design for *use*.

NEED: Much recent design has satisfied only evanescent wants and desires, while the genuine needs of man have often been neglected by the designer. The economic, psychological, spiritual, technological, and intellectual needs of a human being are usually more difficult and less profitable to satisfy than the carefully engineered and manipulated "wants" inculcated by fad and fashion.

People seem to prefer the ornate to the plain as they prefer day-dreaming to thinking and mysticism to rationalism. As they seek crowd pleasures and choose widely traveled roads rather than solitude and lonely paths, they seem to feel a sense of security in crowds and crowdedness. *Horror vacui* is horror of inner as well as outer vacuum.

The need for security-through-identity has been perverted into role-playing. The consumer, unable or unwilling to live a strenuous life, can now act out the role by appearing caparisoned in Naugahyde boots, pseudo-military uniforms, voyageur's shirts, little fur jackets, and all the other outward trappings of Davy Crockett, Foreign Legionnaires, and Cossack Hetmans. (The apotheosis of the ridiculous: a "be-your-own-Paul-Bunyan-kit, beard included," neglecting the fact that Paul Bunyan is the imaginary creature of an advertising firm early in this century.) The furry parkas and elk-hide boots are obviously only role-playing devices, since climatic control makes their real use redundant anywhere except, possibly, in Bismarck, North Dakota.

A short ten months after the Scott Paper Company introduced disposable paper dresses for 99¢, it was possible to buy throw-away paper dresses ranging from $20 to $149.50. With increased consumption, the price of the 99¢ dress could have dropped to 40¢. And a 40¢ paper dress is a good idea. Typically, industry perverted the idea and chose to ignore an important need-fulfilling function of the design: disposable dresses inexpensive enough to make disposability economically feasible for the consumer.

Greatly accelerated technological change has been used to create technological obsolescence. This year's product often incorporates enough technical changes to make it really superior to last year's offering. The economy of the market place, however, is still geared to a static philosophy of "purchasing-owning" rather than a dynamic one of "leasing-using," and price policy has not resulted in lowered consumer cost. If a tele-

vision set, for instance, is to be an every-year affair, rather than a once-in-a-lifetime purchase, the price must reflect it. Instead, the real values of real things have been driven out by false values of false things, a sort of Gresham's Law of Design.

As an attitude, "Let them eat cake" has been thought of as a manufacturer's basic right. And by now people, no longer "turned on" by a loaf of bread, can differentiate only between frostings. Our profit-oriented and consumer-oriented Western society has become so overspecialized that few people experience the pleasures and benefits of full life, and many never participate in even the most modest forms of creative activity which might help to keep their sensory and intellectual faculties alive. Members of a "civilized" community or nation depend on the hands, brains, and imaginations of experts. But however well trained these experts may be, unless they have a sense of ethical, intellectual, and artistic responsibility, then morality and an intelligent, "beautiful," and elegant quality of life will suffer in astronomical proportions under our present-day system of mass production and private capital.

TELESIS: "The deliberate, purposeful utilization of the processes of nature and society to obtain particular goals" (*American College Dictionary*, 1961). The telesic content of a design must reflect the times and conditions that have given rise to it, and must fit in with the general human socioeconomic order in which it is to operate.

The uncertainties and the new and complex pressures in our society make many people feel that the most logical way to regain lost values is to go out and buy Early American furniture, put a hooked rug on the floor, buy ready-made phony ancestor portraits, and hang a flint-lock rifle over the fireplace. The gaslight so popular in our subdivisions is a dangerous and senseless anachronism that only reflects an insecure

striving for the "good old days" by consumer and designer alike.

Our twenty-year love affair with things Japanese —Zen Buddhism, the architecture of the Ise Shrines and Katsura Imperial Palace, haiku poetry, Hiroshige and Hokusai blockprints, the music of koto and samisen, lanterns and sake sets, green tea liqueur and sukiyaki and tempura—has triggered an intemperate demand by consumers who disregard telesic aptness.

By now it is obvious that our interest in things Japanese is not just a passing fad or fashion but rather the result of a major cultural confrontation. As Japan was shut off for nearly two hundred years from the Western world under the Tokugawa Shogunate, its cultural expressions flourished in a pure (although somewhat inbred) form in the imperial cities of Kyoto and Edo (now Tokyo). The Western world's response to an in-depth knowledge of things Japanese is comparable only to the European reaction to things classical, which we are now pleased to call the Renaissance. Nonetheless, it is not possible to translate things from one culture to another.

The floors of traditional Japanese homes are covered by floor mats. These mats are 3×6 feet in size and consist of rice straw closely packed inside a cover of woven rush. The long sides are bound with black linen tape. While tatami mats impose a module (homes are spoken of as six-, eight-, or twelve-mat homes), their primary purposes are to absorb sounds and to act as a sort of wall-to-wall vacuum cleaner which filters particles of dirt through the woven surface and retains them in the inner core of rice straw. Periodically these mats (and the dirt within them) are discarded, and new ones are installed. Japanese feet encased in clean, sock-like tabi (the sandal-like street shoe, or *geta*, having been left at the door) are also designed to fit in with this system. Western-style leather-soled shoes and spike heels would destroy the surface of the mats and also carry much more dirt into

the house. The increasing use of regular shoes and industrial precipitation make the use of tatami difficult enough in Japan and absolutely ridiculous in the United States, where high cost makes periodic disposal and re-installation ruinously expensive.

But a tatami-covered floor is only part of the larger design system of the Japanese house. Fragile, sliding paper walls and tatami give the house definite and significant acoustical properties that have influenced the design and development of musical instruments and even the melodic structure of Japanese speech, poetry, and drama. A piano, designed for the reverberating insulated walls and floors of Western homes and concert halls, cannot be introduced into a Japanese home without reducing the brilliance of a Rachmaninoff concerto to a shrill cacophony. Similarly, the fragile quality of a Japanese samisen cannot be fully appreciated in the reverberating box that constitutes the American house. Americans who try to couple a Japanese interior with an American living experience in their search for exotica find that elements cannot be ripped out of their telesic context with impunity.

ASSOCIATION: Our psychological conditioning, often going back to earliest childhood memories, comes into play and predisposes us, or provides us with antipathy against a given value.

Increased consumer resistance in many product areas testifies to design neglect of the associational aspect of the function complex. After two decades, the television set industry, for instance, has not yet resolved the question of whether a television set should carry the associational values of a piece of furniture (a lacquered mah-jongg chest of the Ming Dynasty) or of technical equipment (a portable tube tester). Television receivers that carry new associations (sets for children's rooms in bright colors and materials, enhanced by tactilely pleasant but non-working controls and pre-set for given times and channels, clip-on swivel sets for hospital beds, etc., etc.) might not only clear

up the astoundingly large back inventory of sets in warehouses, but also *create* new markets.

And what shape is most appropriate to a vitamin bottle: a candy jar of the Gay Nineties, a perfume bottle, or a "Danish modern" style salt shaker?

The response of many designers has been like that so unsuccessfully practiced by Hollywood: the public has been pictured as totally unsophisticated, possessed of neither taste nor discrimination. A picture emerges of a moral weakling with an IQ of about 70, ready to accept whatever specious values the unholy trinity of Motivation Research, Market Analysis, and Sales have decided is good for him. In short, the associational values of design have degenerated to the lowest common denominator, determined more by inspired guesswork and piebald graphic charts rather than by the genuinely felt wants of the consumer.

Many products already successfully embody values of high associational content, either accidentally or "by design."

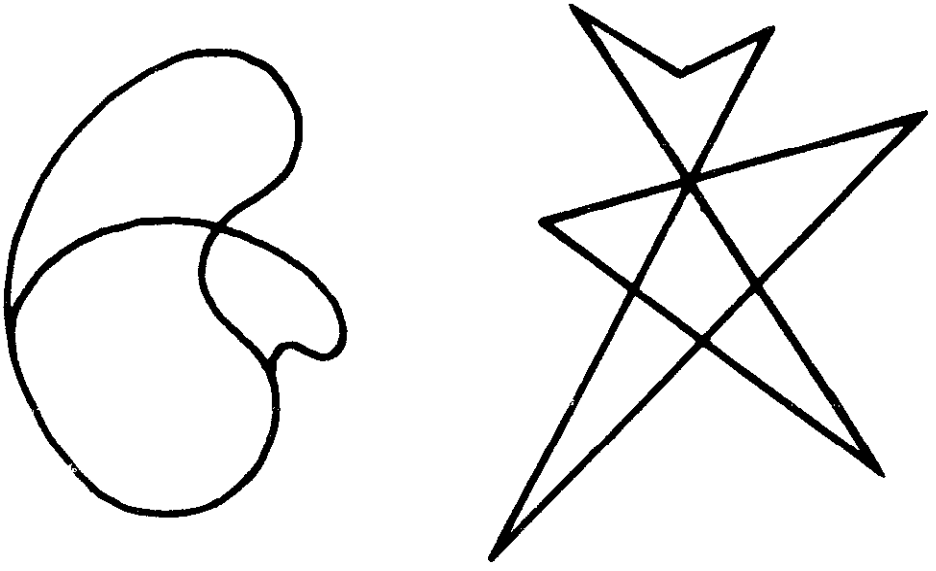
The Sucaryl bottle by Raymond Loewy Associates for Abbott Laboratories communicates both table elegance and sweetening agent without any suggestion of being medicine-like.* The Lettera 22 portable typewriter by Olivetti establishes an immediate aura of refined elegance, precision, extreme portability, and business-like efficiency, while its two-toned carrying case of canvas and leather connotes "all-climate-proof."

Abstract values can be communicated directly to everyone, and this can be simply demonstrated.

If the reader is asked to choose which one of the figures below he would rather call *Takete* or *Maluma* (both are words devoid of all meaning in any known language), he will easily call the one on the right *Takete* (W. Koehler, *Gestalt Psychology*).

*** To this, one must add that *other* bottles manufactured by Abbott Laboratories proved to be insufficiently medicine-like: as of March, 1971, Abbott's infected intravenous-fluid bottles for hospitals had killed nine persons.**

Figure: 2 GESTALT COMPARISON



Takete
Maluma

Many associational values are really universal, providing for unconscious, deep-seated drives and compulsions. Even totally meaningless sounds and shapes can, as demonstrated, mean the same thing to all of us. The unconscious relationship between spectator expectation and the configuration of the object can be experimented with and manipulated. This will not only enhance the "chair-ness" of a chair, for instance, but also load it with associational values of, say, elegance, formality, portability, or what-have-you.

AESTHETICS: Here dwells the traditionally bearded artist, mythological figure with a myth, equipped with sandals, mistress, garret, and easel, pursuing his dream-shrouded designs. The cloud of mystery surrounding aesthetics can (and should) be dispelled. The dictionary definition, *"a theory of the beautiful, in taste and art,"* leaves us not much better off than before. Nonetheless we know that aesthetics is a tool, one of the most important ones in the repertory of the designer,

a tool that helps in shaping his forms and colors into entities that move us, please us, and are beautiful, exciting, filled with delight, meaningful.

Because there is no ready yardstick for the analysis of aesthetics, it is simply considered to be a personal expression fraught with mystery and surrounded with nonsense. We "know what we like" or dislike and let it go at that. Artists themselves begin to look at their productions as autotherapeutic devices of self-expression, confuse license and liberty, and forsake all discipline. They are often unable to agree on the various elements and attributes of design aesthetics. If we contrast the "Last Supper" by Leonardo da Vinci with an ordinary piece of wallboard, we will understand how both operate in the area of aesthetics. In the work of so-called "pure" art, the main job is to operate on a level of inspiration, delight, beauty, catharsis . . . in short, to serve as a propagandistic communications device for the Holy Church at a time when a largely pre-literate population was exposed to a few non-verbal stimuli. But the "Last Supper" also had to fill the other requirements of function; aside from the spiritual, its *use* was to cover a wall. In terms of *method* it had to reflect the material (pigment and vehicle), tools (brushes and painting knives), and processes (individualistic brushwork) employed by Leonardo. It had to fulfill the human *need* for spiritual satisfaction. And it had to work on the *associational* and *telesic* plane, providing reference points from the Bible. Finally, it had to make identification through association easier for the beholder through such clichés as the racial type, garb, and posture of the Saviour.

Earlier "Last Supper" versions, painted during the sixth and seventh centuries, saw Christ *lying* or reclining in the place of honor. For nearly a thousand years, the well-mannered did not *sit* at the table. Leonardo da Vinci disregarded the reclining position followed by earlier civilizations and painters for Jesus and the Disciples. To make the "Last Supper" acceptable to Italians of his time, on an associational plane,

"The Last Supper," by Leonardo da Vinci.

Leonardo sat the crowd around the last supper table on chairs or benches in the proper positions of his (Leonardo's) time. Unfortunately the scriptural account of St. John resting his head on the Saviour's bosom presented an unsolvable positioning problem to the artist, once everybody was seated according to the Renaissance custom.

On the other hand, the primary use of wallboard is to cover a wall. But an increased choice of textures and colors applied by the factory shows that it too, must fulfill the *aesthetic* aspect of function. No one argues that in a great work of art such as the "Last Supper," prime functional emphasis is aesthetic, with *use* (to cover a wall) subsidiary. The main job of wallboard is its use in covering a wall, and the aesthetic assumes a highly subsidiary position. But both examples must operate in all *six* areas of the function complex.

Designers often attempt to go beyond the primary functional requirements of *method*, *use*, *need*, *telesis*, *association*, and *aesthetics*; they strive for a more con-

cise statement: precision, simplicity. In a statement so conceived, we find a degree of aesthetic satisfaction comparable to that found in the logarithmic spiral of a chambered nautilus, the ease of a seagull's flight, the strength of a gnarled tree trunk, the color of a sunset. The particular satisfaction derived from the simiplicity of a thing can be called *elegance*. When we speak of an "elegant" solution, we refer to something consciously evolved by men which reduces the complex to the simple:

> Euclid's Proof that the number of primes is infinite, from the field of mathematics, will serve: "Primes" are numbers which are not divisible, like 3, 17, 23, etc. One would imagine as we get higher in the numerical series, primes would get rarer, crowded out by the ever-increasing products of small numbers, and that we would finally arrive at a very high number which would be the highest prime, the last numerical virgin.
>
> Euclid's Proof demonstrates in a simple and elegant way that this is not true and that to whatever astronomical regions we ascend, we shall always find numbers which are not the product of smaller ones but are generated by immaculate conceptions, as it were. Here is the proof: assume that P is the hypothetically highest prime; then imagine a number equal to $1 \times 2 \times 3 \times 4 \ldots \times P$. This number is expressed by the numerical symbol (P!). Now add to it 1: (P! + 1). This number is obviously not divisible by P or any number less than P, because they are all contained in (P!); hence (P! + 1) is either a prime higher than P or it contains a prime factor higher than P . . . Q.E.D.

The deep satisfaction evoked by this proof is aesthetic as well as intellectual: a type of enchantment with the near-perfect.

2 PHYLOGENOCIDE:

A History of the Industrial Design Profession

We are all in the gutter, but some of us are looking at the stars.

—OSCAR WILDE

The ultimate job of design is to transform man's environment and tools and, by extension, man himself. Man has always tried to change himself and his surroundings, but only recently have science, technology, and mass production made this more nearly possible. We are beginning to be able to define and isolate problems, to determine possible goals and work meaningfully towards them. And an over-technologized, sterile, and inhuman environment has become one possible future; a world choking under a permanent, dun-colored pollution umbrella, another. In addition the various sciences and technologies have become woefully compartmentalized and specialized. Often, more complex problems can be attacked only by teams of specialists, who often speak only their own professional jargon. Industrial designers, who are often members of such a team, frequently find that, besides fulfilling their normal design function, they must act as a communication bridge between other team members. Frequently the designer may be the only one who speaks the various technical jargons. Because of his educational background, the role of team interpreter is often forced upon him. So we find the industrial designer in a team situation becoming the "team synthesist," a position to which he has been elevated only by the default of people from all the other disciplines.

This has not always been true.

Many books on industrial design suggest that design began when man began making tools. While the difference between *Australopithecus africanus* and the modern designer may not be as great as one might think or hope for, the stance of equating man the toolmaker with the start of the profession is just an attempt to gain status for the profession by evoking a specious historical precedent. "In The Beginning Was Design": obviously, but not industrial design. Henry Dreyfuss, one of the founders of the profession, says in *Designing for People* (probably the best and most characteristic book about industrial design):

> The Industrial Designer began by eliminating excess decoration, but his real job began when he insisted on dissecting the product, seeing what made it tick, and devising means of making it tick better—then making it look better. He never forgets that beauty is only skin-deep. For years in our office we have kept before us the concept that *what we are working on is going to be ridden in, sat upon, looked at, talked into, activated, operated, or in some way used by people individually or en masse. If the point of contact between the product and the people becomes a point of friction, then the Industrial Designer has failed. If, on the other hand, people are made safer, more comfortable, more eager to purchase, more efficient—or just plain happier—the designer has succeeded.* He brings to this task a detached, analytical point of view. He consults closely with the manufacturer, the manufacturer's engineers, production men, and sales staff, keeping in mind whatever peculiar problems the firm may have in the business or industrial world. He will compromise up to a point but he refuses to budge on design principles he knows to be sound. Occasionally he may lose a client, but he rarely loses the client's respect.

Industrial design, then, is always related to production and/or manufacturing facilities, a state of affairs enjoyed by neither man nor the Deity.

The first concern with the design of tools and machinery coincided almost exactly with the beginnings of the industrial revolution and, appropriately enough, made its first appearance in England. The first industrial design society was formed in Sweden in 1849, to be followed shortly by similar associations in Austria, Germany, Denmark, England, Norway, and Finland (in that order). The designers of the period were concerned with form-giving, an erratic search for "appropriate beauty" in machine tools and machine-made objects. Looking at the machine, they saw a new thing, a thing that seemed to cry out for decorative embellishments. These decorations were usually garnered from classical ornaments and from major raids into the animal and vegetable kingdoms. Thus, giant hydraulic presses dripped with acanthus leaves, pineapples, stylized wheat sheaves. Many of the "sane design" or "design reform" movements of the time, as these engendered by the writings and teachings of William Morris in England and Elbert Hubbard in America, were rooted in a sort of Luddite anti-machine philosophy. Frank Lloyd Wright said in 1894 that "the machine is here to stay" and that the designer should "use this normal tool of civilization to best advantage instead of prostituting it as he has hitherto done in reproducing with murderous ubiquity forms born of other times and other conditions which it can only serve to destroy." Yet designers of the last century were either perpetrators of voluptuous Victorian-Baroque, or members of an artsy-craftsy clique who were dismayed by machine technology. The work of the *Kunstgewerbeschule*, in Austria, and some isolated German design groups anticipated things to come, but it was not until Walter Gropius founded the German Bauhaus in 1919, that an uneasy marriage between art and machine was achieved.

No design school in history has had greater influence in shaping taste and design than the Bauhaus. It was the first school to consider design a vital part of the production process rather than "applied art" or

"industrial arts." It became the first international forum on design because it drew its faculty and students from all over the world, and its influence traveled as these people later founded design offices and schools in major countries. Almost every major design school in the United States today still uses the basic foundation design course developed by the Bauhaus. It made sense in 1919 to let a German nineteen-year-old experiment with drill press and circular saw, welding gun and lathe, so that he might "experience the interaction between tool and material." Today the same method is an anachronism, for an American teen-ager has spent his entire life in a machine-dominated society (and cumulatively probably a great deal of time lying under various automobiles, souping them up). For a student whose American design school still slavishly imitates teaching patterns developed by the Bauhaus, computer sciences and electronics and plastics technology and cybernetics and bionics simply do not exist. The courses which the Bauhaus developed were excellent for their time and place (telesis), but American schools following this pattern in the seventies are perpetuating design infantilism.

The Bauhaus was in a sense a non-adaptive mutation in design, for the genes contributing to its convergence characteristics were badly chosen. In boldface type, it announced its manifesto: "Architects, sculptors, painters, we must all turn to the crafts. . . . Let us create a *new guild of craftsmen!*" The heavy emphasis on interaction between crafts, art, and design turned out to be a blind alley. The inherent nihilism of the pictorial arts of the post-World War I period had little to contribute that would be useful to the average, or even to the discriminating, consumer. The paintings of Kandinsky, Klee, Feininger, et al., on the other hand, had no connection whatsoever with the anemic elegance that some designers imposed on products.

In America, industrial design, like marathon dances, six-day bicycle races, the NRA and the Blue

Eagle, and free dishes at the movies, was a child of the Depression. At first glance the swollen belly of a child suffering from malnutrition gives it the appearance of being well fed; later you notice the emaciated arms and legs. The products of early American industrial design convey the same sleek obesity and have the same weaknesses.

For the Depression market, the manufacturer needed a new sales gimmick, and the industrial designer reshaped his products for better appearance and lower manufacturing and sales costs. Harold Van Doren's definition of that time in *Industrial Design* was apt:

> Industrial Design is the practice of analyzing, creating, and developing products for mass-manufacture. Its goal is to achieve forms which are assured of acceptance before extensive capital investment has been made, and which can be manufactured at a price permitting wide distribution and reasonable profits.

Harold Van Doren, Norman Bel Geddes, Raymond Loewy, Russel Wright, Henry Dreyfuss, Donald Deskey, and Walter Dorwin Teague were the pioneering practitioners of design in America. It is significant that all of them came from the field of stage design and/or window display.

While the architects sold apples on street corners, the ex-stage-designers and ex-window-dressers were creating "lemons" in lush suites upstairs.

Raymond Loewy's redesign of the Gestetner duplicating machine is probably the first and most famous case of industrial design development. But as Don Wallance was to remark three decades later in *Shaping America's Products:*

> The "before and after" pictures showing Mimeographs, locomotives, refrigerators, furniture and numerous other things transformed by industrial design were most impressive. Even more impressive were

the differences in before and after sales figures. Oddly enough when we look at these things now after a passage of more than twenty-five years, it is no longer so clear whether the "before" or the "after" version has best stood the test of time.

This sort of design for the manipulated visual excitement of the moment continued unabated until the beginning of World War II.

The automobile and other consumer industries had to turn their production facilities over to the creation of war supplies, and war-time demands forced a new (though temporary) sense of responsibility on industrial designers. "Ease-o-matic gear shifts" and "automagic shell feeding mechanisms" were out of place in a Sherman tank. Design staffs encountered real requirements of performance in the function complex, imposed by combat conditions. The necessity for honest design (design-in-use versus design-in-sales) imposed a healthier discipline than that of the market place. Critical material shortages forced these designers who remained in the consumer field to a much keener realization of performance, materials, and other war-imposed limitations. A three-quart casserole, made of plasticized cardboard able to sustain temperatures of 475° for several hours, washable and infinitely reuseable, *retailing* for 45¢, is an excellent example and seems curiously to have disappeared from the market at the end of 1945.

Shortly after the end of the war *The New York Times* carried the first full-page ad for Gimbel's sale of the Reynolds ball-point pen at only $25 each. By Monday morning, Herald Square was so clogged with people waiting for Gimbel's to open that extra police had to be brought in to control the crowds. Places in the ball-point pen queue could be sold for $5 to $10, and until Gimbel's slapped a one-pen-to-a-customer order on the sale Wednesday, pens could be readily sold for $50 to $60 each.

This zany state of affairs lasted for some five

weeks: each day Hudson Lodestar monoplanes landed at La Guardia with thousands of pens in their bellies. Even a three-day truckers' strike couldn't affect the sale, as the union promised to "deliver milk, critical food and Reynolds pens." With a Reynolds pen you could "write under water" but practically nowhere else. They skipped, they blotted, they leaked in your pockets, and there were no replacement cartridges because the pens were one-shot affairs. You threw them away as soon as they ran dry, if not sooner. Still they sold. For the pen was a do-it-yourself Buck Rogers kit; you bought a pen and you were "post-war"; just as every "ruptured duck" dully gleaming in the lapel of a service man's first civilian suit marked the end of one era, the Reynolds pen leaking in his breast pocket marked the beginning of a new. There were other consumer goods available, but this was the only totally new product on the market.

The technology of the year 2000 had come to roost in 1945. Each man's miraculously lightweight Reynolds pen gleaming in aluminum was also his personal reassurance that "our side" had won the war.

(Now it can be told: "our" pen was copied from German ball-points found by Reynolds in a South American bar in 1943.)

Industry pandered to the public's ready acceptance of anything new, anything different. The miscegenative union between technology and artificially accelerated consumer whims gave birth to the dark twins of styling and obsolescence. There are three types of obsolescence: technological (a better or more elegant way of doing things is discovered), material (the product wears out), and artificial (the death-rating of a product; either the materials are substandard and will wear out in a predictable time span, or else significant parts are not replaceable or repairable). Since World War II our major commitment has been to stylistic and artificial obsolescence. (Ironically enough, the ac-

celerated pace of technological innovation frequently makes a product obsolete before artificial or stylistic obsolescence can be tacked onto it.)

In the seventies the social environment within which design operates has undergone still another change, since society itself has become more polarized. Within the United States the "poor are getting poorer" and the fat cats are getting incredibly fatter. On one hand, the middle class attempts to express itself more and more through possession of "campy" little gadgets and to find both identity and value through owning products. On the other hand, abject poverty (previously, decorously and piously hidden away like a demented maiden aunt in a nineteenth-century New England attic) has emerged as a major reality of life. There *are* children starving to death in parts of Mississippi and South Carolina. There are vast population sinks in the large city ghettos, the inhabitants of which share absolutely none of the motivations and aspirations of the middle class. And by no means are all of these people of Negro, Puerto Rican, or Mexican descent. Embittered "senior citizens" from our rural areas, foiled in their attempts to "retire gracefully on $150 a month at age 65," haunt the sleazy resorts of Florida, southern Texas and southern California, dreaming a paranoid dream of fascist restoration to the "good old days."

On a global scale the disparities between the haves and have-nots have become even more terrifyingly vast.

Since 1960 this chasm has widened, with the declining birth rate in both the North American and the Western European technate and the fantastic population explosion in the rest of the world.

We find that the correlation between the "primary useful product life" and the actual length of use also works to the disadvantage of the have-not parts of the world, as the following brief table will show:

Product	Primary Useful Product Life in Years
Bicycle	25
Washing Machines & Irons	5
Band-Power Tools	10
Automobiles	11
Construction Equipment	14
General Purpose Industrial Equipment	20
Agricultural Machinery	17
Railroad Equipment	30
Ships	30
Miniaturized Hi-Fi, Photographic & Film Equipment	35

Much of the above may lie squarely in the areas of sociology and economics, but, as previously pointed out, industrial design attempts a horizontal synthesis that cuts across narrow disciplines and narrow minds. Even though in nearly all other disciplines there is a greater emphasis on vertical specialization, the above is of legitimate concern to the designer (or should be).

In *Never Leave Well Enough Alone*, Raymond Loewy amusingly reminisces about the early years of his crusade, a crusade to get clients. In the late twenties and thirties he, together with other designers, kept knocking on corporate doors, such as those of General Motors, General Electric, General Rubber, General Steel, General Dynamics. In all fairness it must be admitted that he and his co-workers served their corporate masters well and, in fact, still do. But it is dismaying to find that all too many of today's graduating design students eagerly join corporate design staffs, safely wrapped in the cocoon of corporate expense accounts, company-paid country club memberships, de-

Actual Time Used in U.S. in Years	Actual Time Used in Under-Developed Countries in Years
2	75
5	25
3	25
2.2	40+
8	100+
12	75+
15	2500+
30	50
15	80+
1.1	50

ferred annuities, retirement benefits, dread-disease coverage, and a yearly revitalizing visit to one of the stamping grounds of the corporation gauleiters in New England or Aspen, Colorado.

By now it is abundantly clear that a new crusade is needed. Vast areas of need, and concomitantly, need for design, exist all over the world. It is up to the designer (like Raymond Loewy, but in a socially and morally more acceptable way) to knock on doors that have never opened before.

The choice is *not* between corporate charcoal gray, buttoned-down security, on one hand, and a giggling freak-out, high on LSD in a Haight-Ashbury gutter, on the other. There is a third way. The Office of Economic Opportunity, the Southern Appalachian Project, the International Labor Organization in Geneva, Switzerland, UNESCO, UNICEF, as well as many other organizations (of various political colorations) in hundreds of areas concerned with optimal human survival needs: these are just a few directions in which designers should and must move.

3 THE MYTH OF THE NOBLE SLOB:

Design, "Art," and the Crafts

Good Taste is the most obvious resource of the insecure.
People of good taste eagerly buy the Emperor's old clothes.
Good taste is the first refuge of the noncreative.
It is the last-ditch stand of the artist.
Good taste is the anesthetic of the public.

—HARLEY PARKER

The cancerous growth of the creative individual expressing himself egocentrically at the expense of spectator and/or consumer has spread from the arts, overrun most of the crafts, and finally reached even into design. No longer does the artist, craftsman, or in some cases the designer, operate with the good of the consumer in mind; rather, many creative statements have become highly individualistic, auto-therapeutic little comments by the artist to himself. As early as the mid-twenties there appeared on the market chairs, tables, and stools designed in Holland by Wijdveldt, as a result of the *De Stijl* movement in painting. These square abstractions painted in shrill primaries were almost impossible to sit in; they were extremely uncomfortable. Sharp corners ripped clothing, and the entire zany construction bore no relation to the human body. Today we can allow ourselves to sneer at these attempts to transfer the two-dimensional paintings of Piet Mondrian and Theo van Doesburg into "home furnishing." The chairs lasted as sophisticated status symbols for only a few years, but the trend, the attempt to translate fashionable daubs into three-dimen-

sional objects for daily use, still continues. Salvador Dali's sofa constructed in the shape of Mae West's lips may have been a "disengaged" surrealist act, much like Meret Oppenheim's fur-lined cup and saucer, but the oppy-poppy pillows of today sell by the thousands. While it is not a bad idea to have a pillow that sells for $1.50, a pillow that can be folded and stored in one's watch pocket and blown up for use, these small plastic horrors perform none of their functions. They yield but slightly and, being made of transparent plastic with silk-screened polka dots, don't "breathe"—hence the user sweats profusely. In pictures in shelter magazines (such as *House Beautiful* and *House and Garden*), these pillows are usually shown in clusters, but when several are placed together they have an unfortunate tendency to *squeak* against one another like suckling pigs put to the knife. A clutch of these pillows, tastefully "unarranged" on a day bed, looks pleasant. Their use indicates that, as in so many other areas, we have sacrificed all our other needs for a purely visual statement. As the pillows are also bought in a purely visual setting, dissatisfaction does not set in until one attempts to use them. And imagine the dismay of having some romantic interlude punctured by a sudden pillow blow-out.

With new processes and an endless list of new materials at his disposal, the artist, craftsman, and designer now suffers from the tyranny of absolute choice. When everything becomes possible, when all the limitations are gone, design and art can easily become a never-ending search for novelty, and the desire for novelty on the part of the artist becomes an equally strong desire for novelty on the part of the spectator and consumer, until newness-for-the-sake-of-newness becomes the only measure. It is at this point that many different versions of novelty begin to create many different esoteric consumer cliques, and the designer with his wares may become more and more alienated from his society and from the functional complex.

In his novel *Magister Ludi,* Hermann Hesse writes

about a community of intellectual elites who have perfected a mystical, symbolic language, called the "Bead Game," that has reduced all knowledge to a sort of unified field theory. The world outside the community is convulsed by riots, wars, and revolutions, but the players of the Bead Game have lost all contact. They are engaged in exchanging their esoterica with one another in the game. There is a disturbing parallel between Hesse's game and the aspirations of the contemporary artist when he speaks of his goals in the exercise of his private visions. He discourses on space, the transcendence of space, the multiplication of space, the division and negation of space. It is a space devoid of man, as though mankind did not exist. It is, in fact, a version of the Bead Game.

Concerning the artist Ad Reinhardt, *Time* says:

> Among the new acquisitions currently on display at Manhattan's Museum of Modern Art is a large square canvas called "Abstract Painting" that seems at first glance to be entirely black. Closer inspection shows that it is subtly divided into seven lesser areas. In a helpful gallery note at one side, Abstractionist Ad Reinhardt explains his painting. It is: "A square (neutral, shapeless) canvas, five feet wide, five feet high, as high as a man, as wide as a man's outstretched arms (not large, not small, sizeless), trisected (no composition), one horizontal form negating one vertical [sic] form (formless, no top, no bottom, directionless), three (more or less) dark (lightless), non-contrasting, (colorless) colors, brushwork brushed out to remove brushwork, a mat, flat freehand painted surface (glossless, textureless, nonlinear, no hard edge, no soft edge) which does not reflect its surroundings—a pure, abstract, non-objective, timeless, spaceless, changeless, relationless, disinterested painting—an object that is self-conscious (not unconsciousness), ideal, transcendent, aware of nothing but art (absolutely no anti-art)."

This from one of America's "most eloquent artists." The tomes by learned art historians make a great

to-do over the influence of the camera and photography on the plastic arts. And it is certainly true that by placing an apparatus in everyone's hand that made "copying nature" possible for everyone with enough wit to push a button, one of the main objectives of painting—to produce a high-fidelity reproduction—seemed partially fulfilled. It is usually overlooked that even a photograph is a first-order abstraction. Thus in the Galician and Polish backwater sections of the old Austro-Hungarian Empire, village pharmacists did a brisk trade in male model photographs at the beginning of World War I. Each of these wily shopkeepers would stock four stacks of small identical photographs of a cabinet view of male models, $5\frac{1}{2} \times 4$ inches in size. One picture showed the face of a clean-shaven man. The second, that of a man with a moustache. The third picture showed a man with a full beard, while, in the fourth, the model's hirsute elegance encompassed both beard and moustache. A young man called up for military service bought the one of the four photographs that most nearly matched his own face and presented it to his wife or sweetheart to remember him by. And it worked! It worked because the picture of even a stranger with the right kind of moustache *was closer to the face of the departed husband than anything his wife had ever seen before except for his face itself.* (Only by glancing at several, or many, photographs could she have gained the sophistication to be able to differentiate among these various first-order abstractions.) But the role of photography and its influence on art is by now fairly well documented and established.

However, hardly anyone has considered the important impact made by the machine tool and machine perfection. The tolerances demanded of the case for a Zippo cigarette lighter and achieved by automatic handling machinery are far more exact than anything Benvenuto Cellini, possibly the greatest metalsmith of the Renaissance, could have achieved. With modern space hardware technology, plus-minus tolerances of

1/10,000 of an inch are a routine production achievement. This is not to make a value judgment of Cellini versus an automated turret lathe; it is merely to show that "mere perfection" can be routinely had on assembly lines and in factories, thus depriving the plastic arts of a second goal, the "search for perfection." Like it or not, the contemporary artist lives in contemporary society. Man lives today as much in the environment of the machine as the machine lives in the environment of man. It may be belaboring the obvious to say that there are more man-made objects in the landscape than landscape itself. Unable personally to cope with this change in the environment, the modern artist has created a series of escape mechanisms for himself.

Inexorably, the artist lives in a technological world. Even an academic landscape painter living in, say, Cornwall, is bound to see more automobiles than cows on any given day. Some artists, then, see the machine as a threat, some as a way of life, some as salvation. All of them have to find a way to live with it.

Seemingly, one simple way to get rid of a threat is to poke fun at it. While, from its earliest days at the *Cabaret Voltaire* in 1916, the Dadaist movement attempted to show the general absurdity of twentieth-century man and his world, there was always a heavy dose of satirization of the machine involved. From Marcel Duchamp's "ready-mades" ("Why not sneeze," "Fountain," etc.) to many of Max Ernst's "collages," to the satirical conglomerations of mass-produced items in Kurt Schwitters's "Merzbau," the attempt has been to make fun of the machine through ridicule, satire, or burlesque. A contemporary manifestation is Jean Tinguely's "machines." These vast constructs of cogs, screws, umbrella guts, pinwheels, light bulbs, and deflowered sewing machines shake, jiggle, and quake, sometimes exploding or (disappointingly) just smoldering a little. In 1960 one of these "sculptures," composed of myriad pieces of old machines, was erected in the garden of the Museum of Modern Art in New York and, with the setting sun, began to grind into

motion. To the delectation of an overflow audience, parts of the sculpture frenziedly came into action, catching fire and burning until they collapsed into puddles of kerosene and rust, a proceeding that was viewed with some dismay by the New York City fire companies that were called by frightened neighbors.

Over-compensation can be fun, too. Piet Mondrian, finding himself surrounded by machine-made precision in the middle twenties in Holland, decided to turn himself into a machine. His square white canvases divided by narrow black bands with only two or three primary-colored squares or rectangles dynamically balanced could well be the result of machine production. In fact, a computer in Basel, Switzerland, is at present creating Mondrian-like pictures. This may raise the question of creativity; the computer versus Mondrian. Leaving aside the fact that the computer had to be programmed, it shows just what aspect of Mondrian's work was really creative. Shortly after his death, I saw a Mondrian retrospective showing in New York which included some of his unfinished canvases. The black pigment lines were represented by lengths of black tape; on the white background one could still discern the traces of the tape having been moved back and forth. Obviously, Mondrian tried various positions. Having known him during his illness, I know that he would have preferred to sit calmly back in his chair and have two servants move the lines and color areas back and forth until he considered them to be in perfect balance. Had he lived to see graphic readout computers, he would have found them a delightful new toy. From the traces of tape on his white unfinished canvases we can see that Mondrian himself followed computer-like behavior patterns and that what creativity he brought to the process of painting was entirely in the area of aesthetic decision-making. Piet Mondrian's work has found a ready but debased acceptance in the façade design of contemporary buildings, Kleenex packages, and typographical layout.

A third way of dealing with the machine is to avoid it altogether. The Surrealist movement, inheritors of the irrational side of Dadaism, attempted to plumb that region, half cesspool and half garden, known as the unconscious, or id. By basing their highly realistic canvases on subconscious symbols, they hoped to turn themselves into latter-day medicine men, witch doctors, shamans of the pigment. The trouble with this concept is that id-motivated emotions differ from person to person. Salvador Dali may experience a world of voluptuous sexuality from his painting of a burning giraffe (and in fact considers it his most potent painterly sexual stimulus), but it does not communicate sexuality to any of his spectators. Dorothea Tanning's jack-booted naked ten-year-old girl wearing a Gay Nineties sailor hat and sensuously embracing the red-hot pipe of a stove also fails to elicit an appropriate response. There has been a lot of loose talk about the "left hand being the dreamer," Jungian archetypes, intuitional and poetic feeling tones, metaphysics, mysticism, etc. But all the totemistic and fetishistic emblems of the Surrealists failed to come across. A reference point was missing. The Comte de Lautréamont described surrealism as being like "the chance encounter of a sewing machine and an umbrella upon a dissecting table," but thousands of those surreal chance encounters have taken place since then—and some are now one with the hot dust of Spain, of Europe, of Vietnam—and the concept is no longer bizarre.

The human preoccupation of liking to play with doll houses has been used cleverly by Joseph Cornell. His little boxes with strange and esoteric objects cunningly arranged therein are manageable small universes, perfect within themselves, into which no hint of masscult or midcult can enter.

Seeking refuge from the threatening surround by catering to a small coterie (as in the Bead Game) was carried to its highest level by Yves Klein. Some of his methods are described in the book *Collage*. When not busy glueing 426,000 sponges to the wall of a

resort hotel, Mr. Klein was fond of painting watercolors and then placing them in his back yard during heavy rains in order to "obtain a dynamic interchange between nature and man-made images." He used the same rationale for doing oil paintings in a slow-drying vehicle and then strapping them to the roof of his Citroën and driving briskly around "to make the colors clarify." The height of his career was reached when the *Galerie Iris Clert* held his first non-painting show in 1958. The gallery had been painted festively in white, the only objects in view were simple white frames hanging on the walls with descriptions of prices attached, such as: "Non-painting, 30 cm. × 73 cm., Fr. 80,000." The show was a sell-out. Hundreds of Parisians and American visitors solemnly paid for and carried empty white frames to their cars, and, one supposes, then hung them triumphantly in their living rooms. It would be instructive to find out if Mr. Klein would have accepted non-checks.

Although Andy Warhol, Roy Lichtenstein, and Robert Rauschenberg have surrounded their productions with much rationale, their attempts to reduce the unusual to the commonplace and raise the commonplace to the stature of the unusual, are losing propositions. Marilyn Monroe's face identically stenciled 50 times merely attempts to say that Miss Monroe was one of a herd, and interchangeably so, a charge that can be leveled at most Hollywood sex symbols but certainly not at Miss Monroe. The reduction of human emotions to the level of a comic strip episode is an attempt to shield oneself from involvement through banality. And Marcel Duchamp said in a recent periodical: "If a man takes fifty Campbell Soup cans and puts them on a canvas, it is not the retinal image which concerns us. What interests us is the kind of mind that wants to put fifty Campbell Soup cans on a canvas."

Art as self-gratification can, of course, also act as an outlet for aggression and hostility. Niki de Saint-Phalle fires rounds of ammunition into her white plaster constructions from a gun, releasing little bags of paint

that spurt out and dribble all over her pieces. When not engaged with plaster of Paris and her fowling piece, Miss de Saint-Phalle got together with two "collaborators" and constructed a gigantic reclining nude in Stockholm which spectators enter through the vagina to view the interior constructions, a merry-go-round for the kiddies and a cocktail bar within her generously proportioned mammary glands.

Earlier we spoke about the artist suffering from the tyranny of absolute choice. But if he doesn't care to poke fun at the machine, become a machine, turn himself into a bogus witch doctor, construct tiny boxed universes, elevate the commonplace to a symbol of banality, or let out his aggressions on a middle class no longer capable of being shocked, the area of choice is narrowed abruptly. One thing remains: accidents. For a well-programmed computer makes no mistakes. A well-designed machine is free of error. What, then, is more logical than to glorify the mistakes and to venerate the accidents. Jean (Hans) Arp, one of the co-founders of the Dada movement in Zurich during World War I, tried it first: "Forms Arranged According to the Laws of Chance."

Mr. Arp tore up one of his gouache paintings (without looking) then climbed up on top of a step ladder and let the pieces drop. Carefully, he glued them down where they had fallen. A few decades later, another Swiss, named Spoerri, will invite his girl friend for breakfast, then glue all the dishes, soiled paper napkins, bacon rinds, and cereal dregs down on the table, entitle the result "Breakfast with Marie," and hang it, table and all, in a museum. It was probably unavoidable that after Jackson Pollock's dribble-and-blob paintings of the forties and early fifties, the Abstract Expressionist painters would whoop it up for mistake, accident, and the unplanned. One member of this group paints by strapping his brushes to his left forearm since, he says, he "can't breed the ability even out of his left hand." With other painters rolling naked models across their canvases, or riding across their

wet paintings on motorcycles, scooters, bicycles, roller skates, or trampling across them on snow-shoes, the "desire for novelty" is getting full play.

Most of what has been said before regarding the artist's relation to a machine culture still holds true with the most recent movements. To this can be added that, with a continuing search for things that will be perceived as "different," avant garde, or "far out" by his clients or spectators, the contemporary artist has tended to become more "trendy" in his work.

Increasingly, many of us (especially the young) have come to reject material possessions, objects, products per se. That this emotion is engendered largely by the fact that we live in a post-industrial society bursting with gadgets, knick-knacks, and manufactured trivia, is abundantly clear. So now we have "Conceptual Art." A recent production by a leading West Coast painter consisted of some 15 pages of yellow paper. On each page he described with meticulous detail the sizes, colors, textures, and compositions that would have constituted nearly 400 paintings, *provided he had painted them.* Added to this were descriptions of the working conditions under which these canvases would have been painted, had they been painted at all. After reading these descriptive passages, he then burned the papers.

George McKinnon, an exhibition-oriented photographer from the West Coast, photographs pictures appearing in old magazines and entitles these "retrospective pieces."

When museum patrons are invited to a formal opening and are advised *not* to come to the museum but to go instead to the Fifty-third Street subway station and peer into the mirror of a gum-vending machine on the second level; while their friends at exactly the same time are advised to take the Staten Island Ferry and spend the entire trip in the toilet reading *Silence*, by John Cage; and still another party is told to rent a room at the Americana Hotel and

"Armchair" (1964) by Gunnar Aagaard Andersen. Urethane foam, 30" high. Executed at Dansk Polyether Industri, Denmark. Collection The Museum of Modern Art, New York. Gift of the designer. While the chair is ugly, it is incredibly comfortable and "grown" out of foam biomorphically.

spend the time shaving; and all these many activities, indulged in by all these many people simultaneously, constitute both the opening of the art show, as well as the art show itself; we are in the presence of folks trying to play random games. And randomness, as has been stated earlier, is the one game the machine won't play, and, therefore, this too is a reaction against the machine.

Ever since the environment became an "in" thing, we have had Earthworks as another artistic trend. Now Earthworks can be many things: A 30-foot trench dug in the Mojave Desert, one leaf torn off every third oak tree in Tallahassee, Florida; or for that matter, snow lying on a meadow in Colorado, to which nothing has been done whatever.

I don't wish to make any judgments about others finding meaningful creative and artistic engagement by pissing into a snow bank, but surely the good people working in the arts can find more authentic ways of surprising us, delighting us, or reflecting their views.

(Incidentally, all of this and what the future will bring in the arts was listed, described, and explained in a book written in 1948 in England by C. E. M. Joad. Its incredibly appropriate title is *Decadence*.)

What is the relevance of all "art games" of this sort to life? Without question, our time needs paintings, music, sculpture, and poetry. Seldom in fact have both delight and catharsis been needed more. An alternate view might hold that the artists of China, Cuba, and North Vietnam have helped their people's struggle toward liberation through developing new modes of expression that are firmly based on underlying folk art motifs and peasant culture.

Of course, even the self-indulgent salon drivel of New York and San Francisco and Los Angeles can be justified in terms of the people who are doing it. But a recent encounter in New York can at least point to an alternate view: when a number of "painters" smashed two dozen violins and bass fiddles to glue the fragments onto a wall and create a mural, some

probing questions were asked about the young Puerto Ricans and Blacks in the neighborhood who might wish to study music but who could never afford to buy instruments. . . .

And where are there permanent design collections? Besides the Museum of Modern Art in New York, there are vestigial collections in Minneapolis, San Francisco, Boston, and Buffalo, N.Y. The rest of the country may sometimes see a traveling "good design" exhibition, but their exposure to well-designed objects ends with that.

And for that matter, even the most prestigious exhibitions of "good design" can be disappointments. In New York the Museum of Modern Art recently held an exhibition of "well-designed" objects that elevated the ugly, in fact *the consciously ugly*, to a new level. Thus we could see a small, high-intensity lamp that has been designed to look precarious and unstable no matter at what angle it is put down. An unruly gush of plastic, colored precisely the shade of frozen diarrhea, doubles as an easy chair. In short, in a society in which the "machine perfect" or even the "fashionably pleasing" can be obtained with a minimum of effort, grossness and the ugly have become imbued with value to the untrained and under-equipped spectator or consumer. Other such exhibitions of objects are discussed in Chapter Six.

If design is a problem-solving activity, this kowtowing to the lowest common denominator has no reason for existence. It is only when the designer abrogates his responsibilities to himself and others and operates as a pimp for the sales department that he finds this creation of warmed-over "soul food" palatable at all.

Much has been said about the decadence of Rome when the barbarians were outside the gate. There are no barbarians outside ours: we have become our own barbarians, and barbarism has become a do-it-yourself kit.

4 DO-IT-YOURSELF MURDER:

The Social and Moral Responsibilities of the Designer

> The truth is that engineers are not asked to design for safety. Further inaction will be criminal—for it will be with full knowledge that our action can make a difference, that auto deaths can be cut down, that the slaughter on our highways is needless waste . . . it is time to act.
>
> —ROBERT F. KENNEDY

One of my first jobs after leaving school was to design a table radio. This was shroud design: the design of the external covering of the mechanical and electrical guts. It was my first, and I hope my last, encounter with appearance design, styling, or design "cosmetics." The radio was to be one of the first small and inexpensive table radios to compete on the post-war market. Still attending school part-time, I naturally felt insecure and frightened by the enormity of the job, especially since my radio was to be the only object manufactured by a new corporation. One evening Mr. G., my client, took me out on the balcony of his apartment overlooking Central Park.

He asked me if I realized the kind of responsibility I had in designing a radio for him.

With the glib ease of the chronically insecure, I launched into a spirited discussion of "beauty" at the market level and "consumer satisfaction." I was interrupted. "Yes, of course, there is all that," he conceded, "but your responsibility goes far deeper than

that." With this he began a lengthy and cliché-ridden discussion of his own (and by extension his designer's) responsibility to his stockholders and especially his workers.

> Just think what making your radio entails in terms of our workers. In order to get it produced, we're building a plant in Long Island City. We're hiring about 600 new men. Now what does that mean? It means that workers from many states, Georgia, Kentucky, Alabama, Indiana, are going to be uprooted. They'll sell their homes and buy new ones here. They'll form a whole new community of their own. Their kids will be jerked out of school and go to different schools. In their new subdivision supermarkets, drugstores, and service stations will open up, just to fill their needs. And now, just suppose the radio doesn't sell. In a year we'll have to lay them all off. They'll be stuck for their monthly payments on homes and cars. Some of the stores and service stations will go bankrupt when the money stops rolling in. Their homes will go into sacrifice sales. Their kids, unless daddy finds a new job, will have to change schools. There will be a lot of heartaches all around, and that's not even thinking of my stockholders. And all this because you have made a design mistake. *That's* where your responsibility really lies, and I bet that they never taught you this at school!

I was very young and, frankly, impressed. Within the closed system of Mr. G.'s narrow market dialectics, it all made sense. Looking back at the scene from a vantage point of a good number of years, I must agree that the designer bears a responsibility for the way the products he designs are received at the market place. But this is still a narrow and parochial view. The designer's responsibility must go far beyond these considerations. His social and moral judgment must be brought into play long *before* he begins to design, since he has to make a judgment, an a priori judgment at that, as to whether the products he is asked to

design or redesign merit his attention at all. In other words, will his design be on the side of the social good or not.

Food, shelter, and clothing: that is the way we have always described mankind's basic needs; with increasing sophistication we have added: tools and machines. But man has more basic needs than food, shelter, and clothing. We have taken clean air and pure water for granted for the first ten million years or so, but now this picture has changed drastically. While the reasons for our poisoned air and polluted streams and lakes are fairly complex, it must be admitted that the industrial designer and industry in general are certainly co-responsible with others for this appalling state of affairs.

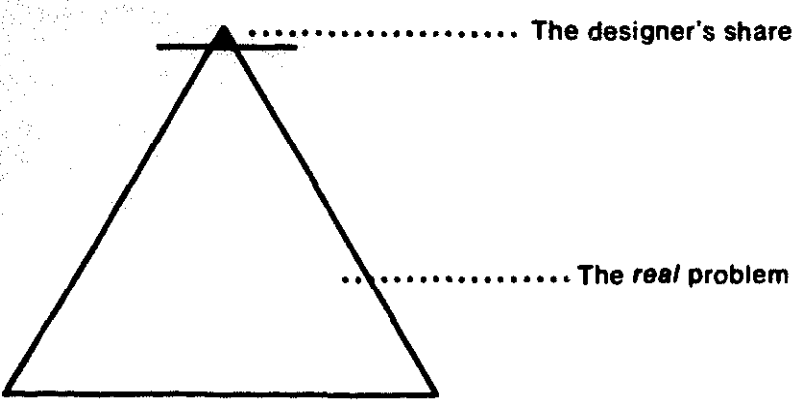
In the mid-thirties the American image abroad was frequently created by the movies. The make-believe, fairyland, Cinderella-world of "Andy Hardy Goes To College" and "Scarface" communicated something which moved our foreign viewers more, directly and subliminally, than either plot or stars. It was the communication of an idealized environment, an environment upholstered and fitted out with all the latest gadgets available.

Today we export the products and gadgets themselves. And with the increasing cultural and technological Coca-colonization of that part of the world we are pleased to think of as "free," we are also in the business of exporting environments and "life styles" of the prevalent white, middle-class, middle-income society abroad and into ghettos, poverty pockets, Indian reservations, etc., at home.

The designer-planner is responsible for nearly all of our products and tools and nearly all of our environmental mistakes. He is responsible either through bad design or by default: by having thrown away his responsible creative abilities, by "not getting involved," or by "muddling through."

Three diagrams will explain the lack of social en-

Diagram 1: THE DESIGN PROBLEM



gagement in design. If (in Diagram 1) we equate the triangle with a *design problem*, we really see that industry and its designers are conceived only with the tiny top portion, without addressing themselves to the real needs.

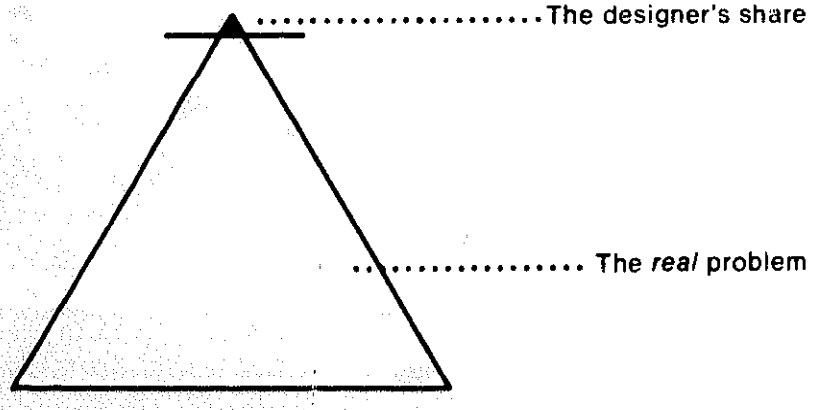
Let's take a rural mailbox for example. As it is now, it is usually large enough to hold letters and several magazines for a number of days. The structure is sheet metal and vaguely breadbox-shaped so that snow, ice, and rain will easily slide off. It also carries a small signal flag to be raised when the mail is delivered. It is inexpensive and sturdy.

Quite recently a West Coast design office redesigned rural mailboxes for a national manufacturer. The result: a series of French Provincial, Japanese, colonial, or spaceship-inspired extravaganzas which are costly and which clutter up the visual landscape. They are "high-style" enough to be forced into obsolescence every few years and, incidentally, snow no longer slides off them. They will probably sell well in suburbia and exurbia and will take on some of the symbolic values of new status objects. The manufacturers are to be congratulated: many more mailboxes will be sold and, more importantly, many more can be pushed upon the public every few years as even fashion in mailboxes is manipulated.

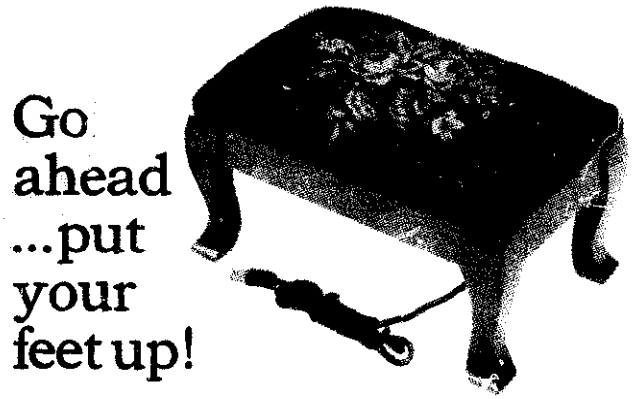
What is the designer's evaluation? There is little

wrong with the rural mailbox as it stands, apart from its cluttering the landscape. But if redesign is called for, then the real problems of rural mail delivery, in other words the huge bottom area of our diagrammatic triangle, must be re-examined. To what extent can mailboxes be made to recede (or even disappear) into the landscape? Can new materials, tools, and processes reduce costs and, more importantly, reduce material waste? Can these containers be made tamper-proof and vandal-proof? With heavier mail does the old size still hold true? Can redesign help delivery? (With the incredibly antiquated mail delivery system in the United States there is little doubt that electronic data-scanning procedures will result in a more nearly normal delivery schedule: until quite recently in England, for instance, city mail was delivered eight times daily, rural mail four times.) Should the consumer in fact be required to buy mailboxes at all or should a minimal Federal standard be written which eases delivery procedures and guards privacy? Should local newspapers be permitted to add their own tubular "mailboxes," using them as shrill billboards which further befoul the edge of the road? These are only a few of the questions which a committed designer would ask himself; at last, most of the triangle (top and bottom) would be explored.

Diagram 2: A COUNTRY



This idiot gadget is made and successfully sold in one part of the world . . .



...just plug it in...put your feet up and *relax!* This charming Queen Anne style footstool does the rest with soothing warmth. Covered with a traditional petit point type tapestry ...multicolor floral print pattern on black. Handsomely crafted of fine mahogany...beautifully hand polished. Looks well in room. So, give your feet a treat...makes an unusual and thoughtful gift, too! Satisfaction guaranteed. Only *$16.95* plus 50¢ for delivery.

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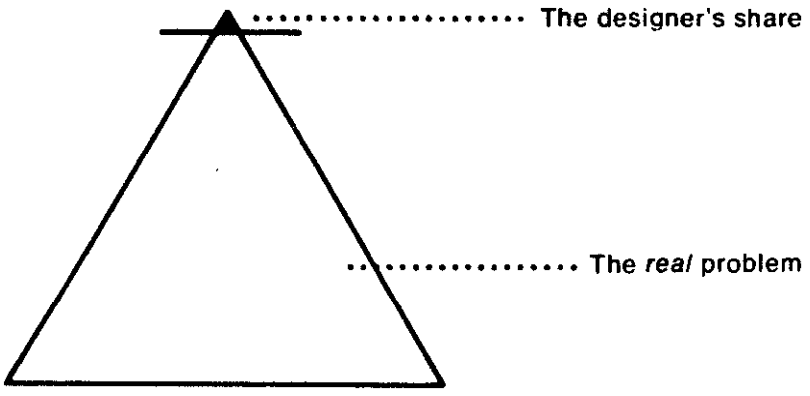
. . . while in another, this is a family's sole means of cooking. Mexican stove from Jalisco, made of used license plates and sold for about 8 cents. It is used as a charcoal brazier. When the soldering finally pops after some ten or fifteen years of use, it is repaired, if possible, or else the family has to invest another 8 cents for a "new" stove. (Anonymous design, collected by John Frost, author's collection. Photo: Roger Conrad.)

Diagram 2 is, of course, identical to Diagram 1. Only the labels have changed. For "Design Problem" we have substituted "Country." In a way, the justice of this becomes immediately apparent when talking about some far-off, exotic place. If we let the entire triangle stand for nearly any South or Central American nation we can see its telesic aptness. Nearly all of these countries exist with wealth concentrated in the hands of a small group of "absentee landlords." Many of these people have never seen the South American country which they so efficiently "administer" and exploit. Design is a luxury enjoyed by a small clique who form the technological, moneyed, and cultural "elite" of each nation. The 90 per cent native Indian population which lives "up-country" has neither tools nor beds nor shelter nor schools nor hospitals that have ever been within breathing distance of designer's

board or workbench. It is this huge population of the needy and the dispossessed who are represented by the bottom area of our triangle. If I suggest that this holds equally true of most of Africa, Southeast Asia, and the Middle East, there will be little disagreement.

Unfortunately, this diagram applies just as easily to our own country. The rural poor, the black and white citizens of our inner cities, the educational tools we use in over 90 per cent of our school systems, our hospitals, doctors' offices, diagnostic devices, farm tools, etc., suffer design neglect. New designs may sporadically occur in these areas, but usually only as a result of market pressures, rather than as a result of either research breakthrough or a genuine response to a real need. Here at home we too must assign those served by the designer to the minuscule upper part of the triangle.

Diagram 3: THE WORLD



As the reader will have discovered by now, the third diagram is identical to the first and the second. But again we have changed labels. For now we call it "The World." Can there be substantial doubt that the peoples of this world are not served by designers?

Where has our spirit of innovation gone? This is not an attempt to "take all the fun out of life." After all, it is only right and proper that "toys for adults" should be available to those willing to pay for them, and after all, as has been pointed out all too often, we live in an abundant society. But only a small part of our responsibility lies in the area of aesthetics. Sometimes one is tempted to ask why not *one* American table radio, for example, is well designed, whereas Sony, Hitachi, Panasonic, and Aiwa carry lines of some 84 highly specialized table radios, each one designed for a specific use area. (This record could easily be duplicated with tape recorders, TV sets, or, say, cameras.) After all, many book publishers, while pushing incredible trash onto best-seller lists, manage to bring out a few worthwhile volumes each year.

I am not necessarily pleading for extraordinary, innovative design for radios, alarm clocks, high-intensity lamps, refrigerators, or whatever; I am just hoping for product statements aesthetically acceptable enough not to conjure up visions of a breadbox raped by a

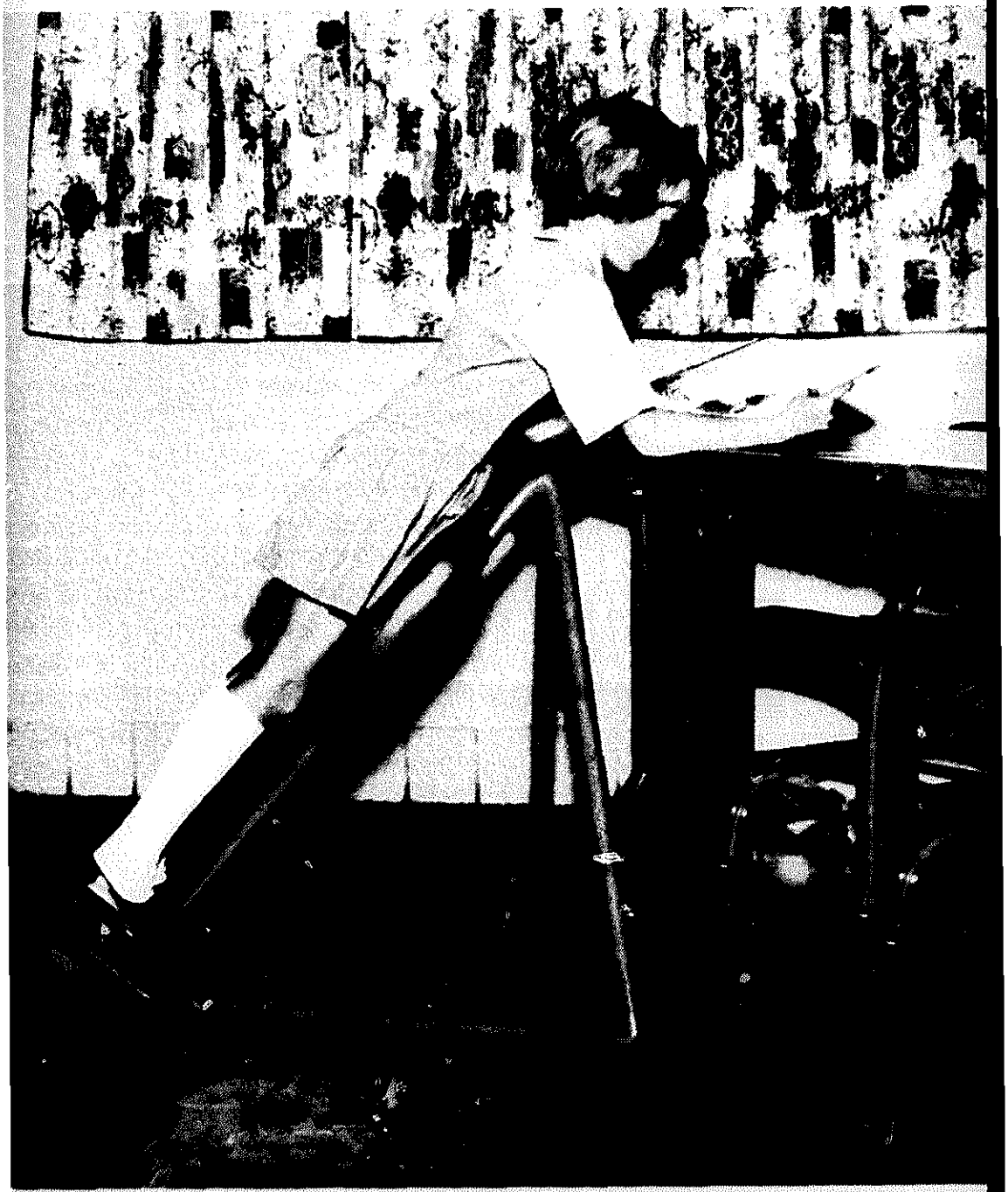
Cadillac in heat. Isn't it too bad that so little design, so few products are really relevant to the needs of mankind? Watching the children of Biafra dying in living color while sipping a frost-beaded martini can be kicks for lots of people, but only until *their* town starts burning down. To an engaged designer, this way of life, this lack of design, is not acceptable.

All too often designers who try to operate within the entire triangle (problem country or world) find themselves accused of "designing for the minority." Apart from being foolish, this charge is completely false and reflects the misconception and misperception under which the design field operates. The nature of this faulty perception must be examined and cleared up.

Let us suppose that an industrial designer or an entire design office were to "specialize" exclusively within the areas of human needs outlined in this and other chapters. What would the work load consist of? There would be the design of teaching aids: teaching aids to be used in pre-nursery-school settings, nursery schools, kindergartens, primary and secondary schools, junior colleges, colleges and universities, graduate and post-doctoral research and study. There would be teaching aids and devices for such specialized fields as adult education, the teaching of both knowledge and skills to the retarded, the disadvantaged, and the handicapped; as well as special language studies, vocational re-education, the rehabilitation of prisoners, and mental defectives. Add to this the education in totally new skills for people about to undergo radical transformation in their habitats: from slum, ghetto, or rural poverty pocket to the city; from the milieu of, say, a central Australian aborigine to life in a technocratic society; from Earth to space or Mars; from the tranquility of the English countryside to life in the Mindanao Deep or the Arctic.

The design work done by our mythical office would include the design, invention, and development of medical diagnostic devices, hospital equipment, dental

Perch or reclining structure to be used in classrooms *in addition* to regular chairs. This provides eight more positions for restless children. Designed by Steven Lynch, as a student at Purdue University.

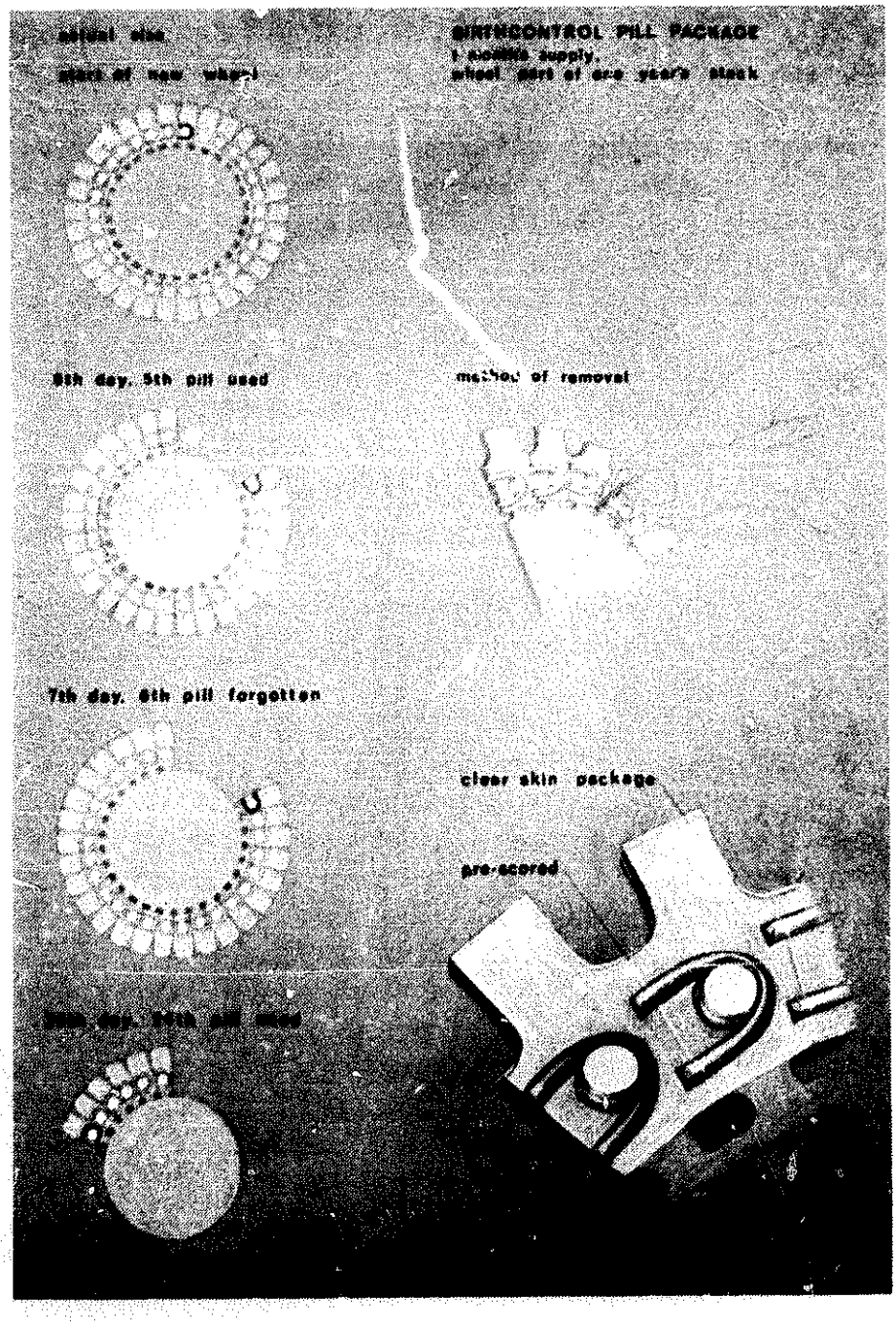


equipment, surgical tools and devices, equipment and furnishings for mental hospitals, obstetrician's equipment, diagnostic and training devices for ophthalmologists, etc. The range of things would go all the way from a better readout of a fever thermometer at home to such exotic devices as heart-lung machines, heart pacers, artificial organs, and cyborgian implants, and back again to humble visor-like eyeglasses, reading mechanisms for the blind, improved stethoscopes and urinalysis devices, hearing aids and improved calendrical dispensers for "the pill," etc.

The office would concern itself with safety devices for home, industry, transportation, and many other areas; and with pollution, both chemical and thermal, of rivers, streams, lakes, and oceans as well as air. The nearly 75 per cent of the world's people who live in poverty, starvation, and need would certainly occupy still more time in the already busy schedule of our theoretical office. But not only the underdeveloped and emergent countries of the world have special needs. These special needs abound at home as well. "Black lung' disease among the miners of Kentucky and West Virginia is just one of a myriad of occupational ills, many of which can be abolished through relevant redesign of equipment and or processes.

Middle and upper managerial ranks (if male and between ages of thirty-five and sixty) are a prime health-hazard group. The incidence of death from cardiovascular arrests by stroke or heart attack is frighteningly high. This loss of human lives can be ascribed to three main causes: faulty diet, a lack of exercise, and stress syndromes. Exercising equipment with built-in motivation might spare the lives of many people in this group, a group desperately needed all over the world to keep humanity going.

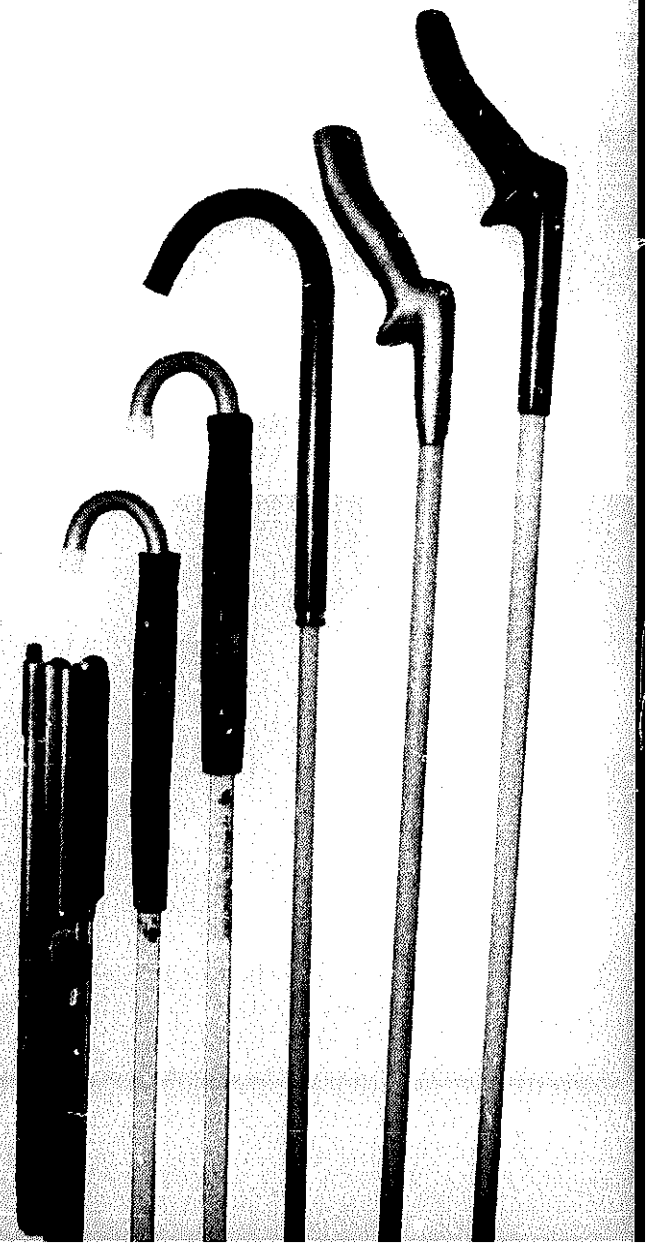
Basic shelters for American Indians and the Lapp population of Norway, Sweden, and Finland—and shelters (both temporary and permanent) for all men poised at the edge of an alien environment—need design and discovery. Whether it be a comparably simple



Package for birth control pills for use by largely illiterate people. A run of placebos is included so that counting is unnecessary. If a user forgets to break off one day's pill from styrene wafer, the U-shaped tube turns red, as a reminder. Designed by Pirkko (Tintti) Sotamaa, Purdue University.

shelter such as a space station or dome cities for Venus or Mars or something as complex as the complete "terraforming" of the moon, our design office will be needed here just as it is in sub-oceanic cities, Arctic factories, and artificial island cities to be anchored like so many pleasure boats in the Amazon River Basin, the Mediterranean, or around the (genuine) island chains of Japan and Indonesia.

Research tools are usually "stuck-together," "jury-rigged" contraptions, and advanced research is suffering from an absence of rationally designed equipment.



Canes for the blind, of hand-aligned fiber optics. They glow in the dark and also provide a more sensitive tactile feedback for the hand. Student designed by Robert Senn, Purdue University.

the matter is that all of us are children at one point of our lives, and that we need education throughout our lives. Almost all of us become adolescent, middle-aged, and old. We all need the services and help of teachers, doctors, dentists, and hospitals. We all belong to special need groups, we all live in an underdeveloped and emergent country of the mind, no matter what our geographical or cultural location. We all need transportation, communication, products, tools, shelter, and clothing. We must have water and air that is clean. As a species we need the challenge of research, the promise of space, the fulfillment of knowledge.

If we then "lump together" all the seemingly little minorities of the last few pages, if we combine all these "special" needs, we find that we have designed for the majority after all. It is only the "industrial designer," style-happy in the seventies of this century, who, by concocting trivia for the market places of a few abundant societies, really designs for the minority.

Why this polemic? What is the answer? Not just for next year but for the future, and not just in one country but in the world. During the summer of 1968 I discovered a Finnish word dating back to medieval times. A word so obscure that many Finns have never even heard it. The word is: *kymmenykset.* It means the same thing as the medieval church word *tithe.* A tithe was something one paid: the peasant would set aside 10 per cent of his crop for the poor, the rich man would give 10 per cent of his income at the end of the year to feed those in need. Being designers, we don't have to pay money in the form of *kymmenykset* or a tithe. Being designers, we can pay by giving 10 per cent of our crop of ideas and talents to the 75 per cent of mankind in need.

There will always be men like Buckminster Fuller who spend 100 per cent of their time designing for the needs of man. Most of the rest of us can't do that well, but I think that even the most successful designer can afford one tenth of his time for the needs of men.

It is unimportant what the mechanics of the situation are: four hours out of every forty, one working day out of every ten, or ideally, every tenth year to be spent as a sort of sabbatical designing for many instead of designing for money.

Even if the corporate greed of many design offices makes this kind of design impossible, students should at least be encouraged to work in this manner. For in showing students new areas of engagement, we may set up alternate patterns of thinking about design problems. We may help them to develop the kind of social and moral responsibility that is needed in design.

Problems are everywhere. Left-handedness has never been designed for (see Chapter Six). The SDS used compelling rhetoric some years ago about "talking to the workers." But how about working with the workers? "Hard hats" are given their name because of the protective headgear they wear. But these hats are unsafe, not sufficiently tested for absorption of kinetic energy. I should like to quote from the pamphlet of the "safety" helmet made by Jackson Products of Warren, Michigan:

> CAUTION: This helmet provides limited protection. It reduces the effect of the force of a falling object striking the top of the shell.
>
> Contact of this helmet shell with energized electrical conductors (live wires) or equipment, should be avoided. NEVER ALTER or MODIFY the shell or suspension system.
>
> Inspect regularly and replace suspension system and shell at first sign of wear or damage.
>
> *The WARNING stated above applies to all industrial safety hats and caps, regardless of manufacturer.* (My italics.)

This last statement really seems to be true since all hard-hat pamphlets carry this warning, using almost identical words.

The nearly two million safety goggles manufactured annually in this country are unsafe—the lenses scratch easily, some may shatter, and most crack the bridge of the nose under a blow. So-called "hard shoes," designed to protect the front of the foot against falling debris, do not absorb sufficient kinetic energy to be useful; the steel cap over the toes can be crushed by a small steel beam falling one yard. Most cabs in long-distance trucks vibrate so that they will materially destroy a man's kidneys in 4 to 10 years. The list could go on.

What may be needed here is a designers' commune. Most communes in this country have determinedly marched into the past. But baking bread, playing a guitar, weaving fabrics and doing ceramics are not the only rational alternatives to a consumer society. Nor is the mind-blowing violence of a Charles Manson. With most of the communes poised in a choice between nihilism and nostalgia, a commune of planners and designers might prove to be the best alternative. (I've written more about this in Chapter Twelve.)

There must have been a time a few million years ago when some nameless early caveman killed a rabbit, ate it in his cave, and threw the bones on the ground. And surely his wife implored him to throw the bones out of the cave, to keep it neat and clean. Times have changed. We are all in the same cave together, and there is no longer any place to throw the trash. Or to change to a more meaningful metaphor, we are all together on this small spaceship called "Earth," 7,900 miles in diameter and sailing through the vast oceans of space. It's a small spaceship and 50 to 60 per cent of the population cannot help to run it, or even help themselves stay alive, through no fault of their own. Where hunger and poverty lead small children to eat the paint off walls and die of lead poisoning in Chicago and New York ghettos. Where children in Los Angeles and Boston die of infected rat bites. To deprive ourselves of the brain and po-

tential of any person on our spaceship is wrong and no longer acceptable.

All this raises the question of value. If we have seen that the designer is powerful enough (by affecting all of man's tools and environment) to put murder on a mass production basis, we have also seen that this imposes great moral and social responsibilities. I have tried to demonstrate that by freely giving 10 per cent of his time, talents, and skills the designer can help. But help where? What is a need?

In the early fifties I had the good fortune to enjoy a lengthy correspondence with the late Dr. Robert Lindner of Baltimore. Together we worked on a book to be called *Creativity Versus Conformity*, a collaboration ending only with his untimely death. I should like to quote extensively from the Prologue (pp. 3–6) of his *Prescription for Rebellion* concerning his concept of value:

> The end to which man studies himself cannot be other than to realize the full potentiality of his being, and to conquer the *triad of limitations* fate or God, or destiny, or sheer accident, has imposed on him. Human beings are enclosed by an iron triangle that forms for their race a veritable prison cell. One side of this triangle is the medium in which they must live; the second is the equipment they have, or can fashion, with which to live; the third is the fact of their mortality. All effort, all being, is directed upon the elimination of the sides of this enclosure. If there is purpose to life, that purpose must be to break through the triangle that thus imprisons humanity into a new order of existence where such a triad of limitations no longer obtains. This is the end toward which both individual and species function; this is the end toward which the race strives; this is the end which gives meaning and substance to life.
>
> Behind and beyond the word-games philosophers play, and in the final analysis, all that man does—alone or in the organizations he erects—has as its design the overcoming of one or more or all aspects of

this basic triad of limitations. What we call progress is nothing more than the small victories every man or every age wins over any or all of the sides of the imprisoning triangle. Thus progress, in this one and only possible sense, is a measurable thing against which the sole existence of a person, the activities, and aims of a group, even the achievements of a culture, can be estimated and assigned value.

The as yet uncalculated millennia during which man has tenanted Earth have been witness to his continued valiant efforts to escape from the triangle that interns him. Inexorably and against odds, over the centuries, he has fought against and conquered the medium of his habitat until now he stands poised on a springboard to the stars. Today, earthbound no longer, and loosening even the fetters of gravity, he can look backward to count his conquests. The elements have succumbed to him, and also the natural barriers of space and time. Once confined to a small area bounded by the height of the trees he could climb, the distance his legs could carry him, the view his eye could encompass, the length his voice could carry, the reach of his arms, and the acuity of his remaining senses—once a cowed victim of every hazard to existence vagrant Nature has in her catalogue—now he is lord over those containing powers that would have held him slave to them forever. So one iron wall of his cell has been worn thin, and, through the vents and cracks he has made in it, come far-traveled winds of freedom and the beckoning gleam of the universes outside.

Similarly, the second side of the triangle—the limitations imposed by the biologically given equipment of human beings—has yielded step by step to the ongoing, persistent struggle against it by men. In the main, this has been a process of extension. It has been marked by the fashioning of tools to improve the uses of the limbs, the sensitivities of the specialized end-organs and the efficiency of those other parts and organs that complete the body. Here the victories have been of an immense order of magnitude. They have culminated in what amounts to

a total breakthrough of the envelope of skin that enwraps us, even to the point where the products of hand and brain—as in the giant computing machines and other physical miracles of our time—by far outdo many capacities of their creators. And, finally, in the matter of the last side of the triangle, while the days of our years still last but an eyewink on the bland face of the eternal clock, longevity if not immortality is now more than a promise.

The uses of knowledge are clear despite the turgid morass through which a seeker must plow to find order and sense therein. The sciences and arts—like the individual lives men live—are all strivings and experiments. They are pointed toward the realization of human potentiality and ultimately contributory to that evolutionary breakthrough which will come when the walls of the containing triangle finally crash to earth. Thus the value of an item of knowledge, an entire discipline, or a deed of art can be placed upon a scale, and its measure also taken.

Much as we have established a six-sided "function complex" in order to evaluate design in the first chapter, we can now plug in the "triad of limitations" and use it as a primary filter to establish the social value of the design act. While the American automobile is examined in great detail in a later chapter, it can be used as a demonstration object now.

Early automobiles overcame one of the three prison walls of the triad. It was possible to go farther and faster in an automobile than a human being's legs would carry him, and to carry a heavy load as well. But today the automobile has become so overloaded with false values that it has emerged as a full-blown status symbol, dangerous rather than convenient. It breathes and exhales a great amount of cancer-inducing fumes, it is overly fast, wastes raw materials, is clumsy, and kills 50,000 people in an average year. On an average weekday the time needed in rush hour to go from the East River to the Hudson on Forty-second Street in New York is at least one hour: a

man walking can easily do it in but a fraction of that time. Considering these aspects, the concept of the automobile has been manipulated so that it now shores up the wall of mortality in the triad; its contributions have grown negligible by comparison.

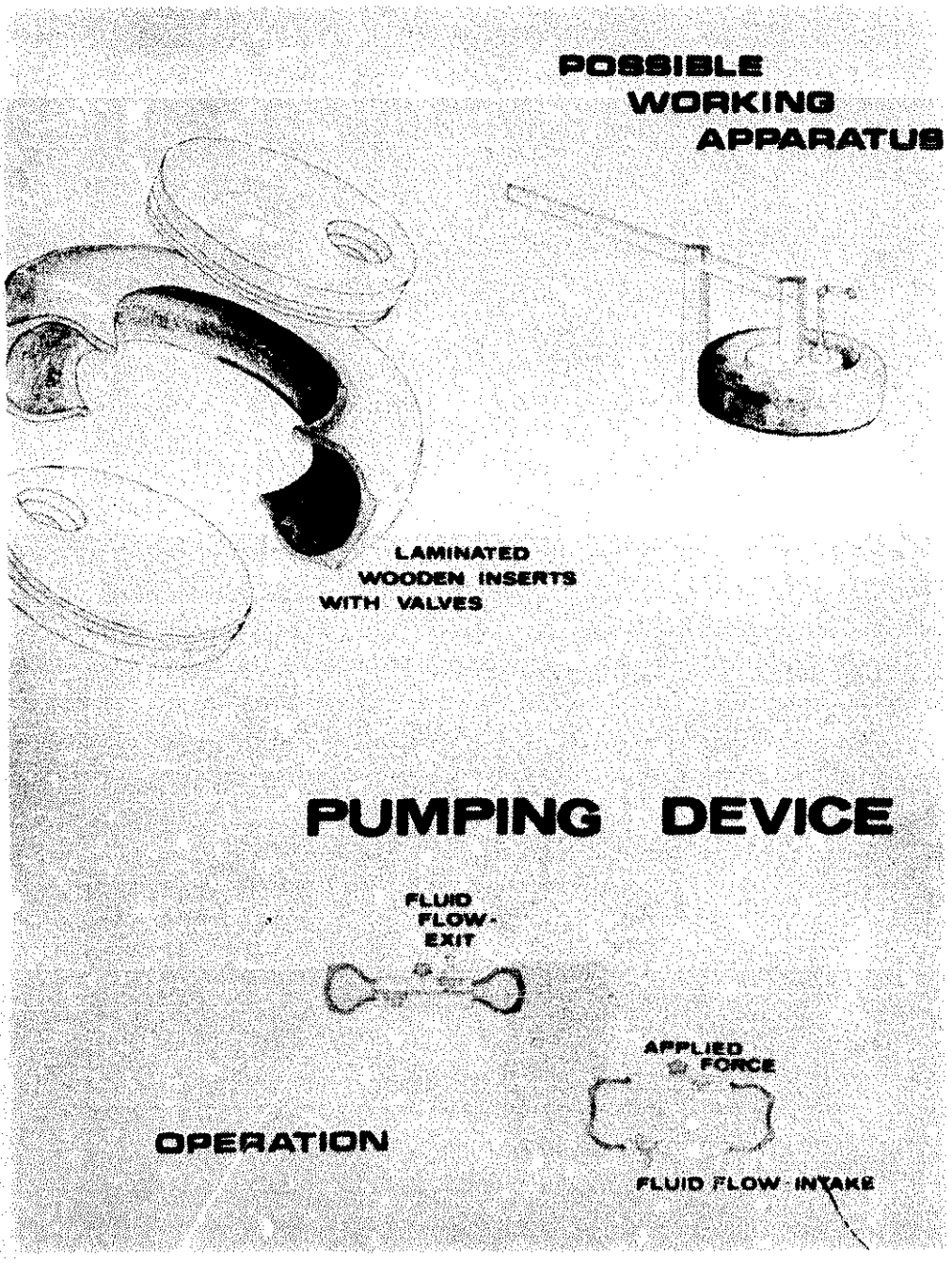
The car, however, is only one example. Everything designed by man can be forced through the filter and evaluated in a similar matter.

K. G. Pontus Hultén's *The Machine as Seen at the End of the Mechanical Age* (1968) is an excellent book. Two quotes from it are relevant here. Commenting on Jean Tinguely's "Rotozaza No. 1," Hultén says:

> The production of articles that nobody really needs, but which occupy the ground floors of all big stores, is one of the many outward symptoms of something basically wrong in a world of overproduction and undernourishment. In order to control overproduction, without going through the intricacies of selling the product, it becomes necessary for a wilfully destructive war to be going on permanently somewhere. Today, the world is spending over $150 billion per annum on the actual or potential destruction of lives and property, as compared with the capital transfer from rich to poor countries of about $10 billion per year—including a large share for military aid.

And on the following page, in reference to another work, he continues:

> Probably the greatest political problem facing the world today is the difference among various regions as regards their technological development. Many parts of Europe and America are already leaving the mechanical age to enter the electronic era, while much of Africa, for example, is only beginning to be industrialized.
>
> To some extent, the mechanical age seems linked to the age of colonialism. Both reached their apogee in the nineteenth century; both were based on the instinct for exploitation. The world was prospected to discover and cultivate raw materials with which to



One of a series of twenty investigations into the use of old tires, which now abound in the Third World. Both of these irrigation pumps have since been built and verified. Designed by Robert Toering, as a student at Purdue University.

feed the machines. It rarely occurred to the ruling powers that the people whose soil produced these materials, and who sweated to bring them forth, should have any appreciable use and benefit from other products. Whenever the natives made any serious trouble, the usual response was to send a gunboat.

Up to 1950, there were four independent countries in Africa: today, there are more than forty. They are politically aware and highly nationalistic, but technologically extremely underdeveloped. Industrial output in all of Africa (except South Africa) is, in fact, less than that in Sweden alone. Unless foreign governments and private corporations unite with the African nations in a massive and long-range program of industrial development, the social and political results will probably be explosive.

What needs to be done? And how can we do it? A series of examples may serve as the best answer.

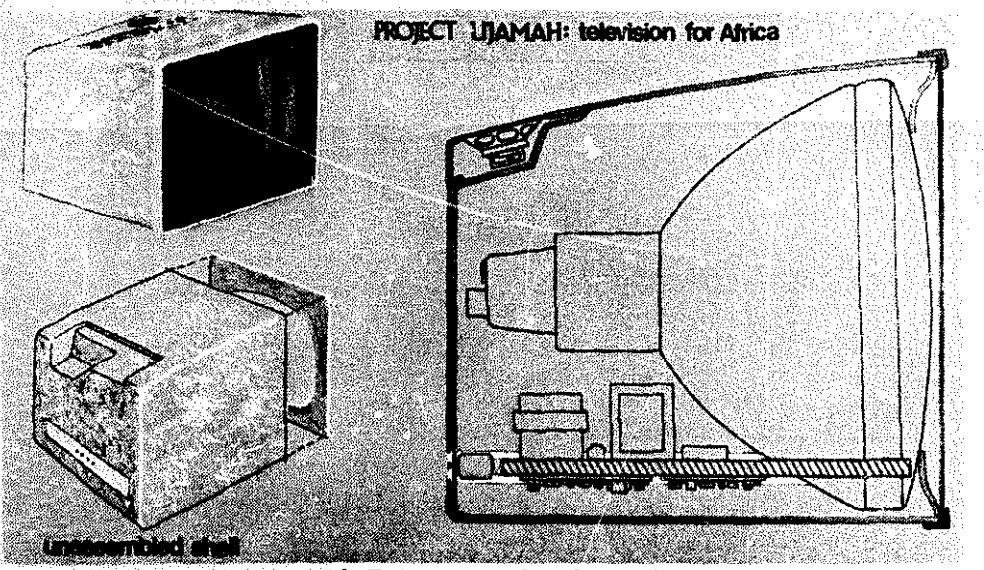
One of the world's few really great designs for emergent countries was developed during the last 25 years by a team of 3 designers from as many different countries. It is a brick-making machine. This simple device is used as follows: Mud or earth is packed into a brick-shaped receptacle, a large lever is pulled down, and a perfect "rammed earth" brick results. This apparatus permits people to "manufacture" bricks at their own speed—500,000 a day or 2 a week. Out of these bricks schools, homes, and hospitals have been built all over South America and the rest of the Third World. Today schools, hospitals, and entire villages stand in Ecuador, Venezuela, Ghana, Nigeria, Tanzania, and many other parts of the world. The concept is a great one: it has kept the rain off the heads of people, and it has made instruction possible in schools where it was not possible before and where the schools themselves did not exist a few years ago. The brick machine has made it possible to construct factories and install equipment in areas where this had never

been attempted in the past. This is socially conscious design, relevant to the needs of people in the world today.

During the international design festival at Jyväskylä, Finland, in 1968, I participated as part of a UNESCO team of international design experts to develop new ideas for Black Africa. Many problems await solution. The circulatory system of the Third World, and specifically Black Africa, is very bad. The people get sick because waste products cannot be efficiently rinsed away; there is almost no sanitation. There is not enough water because water is polluted by precipitation, by flowing through open ditches, and by incredibly fast evaporation, Often water is uncontrolled and washes away precious topsoil. Irrigation is virtually non-existent in the villages. The missing element is a *pipe*, or rather a simple device that will it possible to manufacture pipe segments in the village, by "cottage industry" or by an individual. So the task is to design a pipe-making machine. A pipe-making machine that can be built in Africa by Africans and used for the common good. A machine (or tool) that will by-pass private profit, corporate structures, exploitation, and neo-colonialism.

Black men from seven nations told me that one of their greatest needs was an inexpensive educational TV set. This will be a set to be distributed to African states through UNESCO, to be made in Africa, using native materials as far as possible, as well as local labor. It should give no profit to any private corporation in Europe or North America.

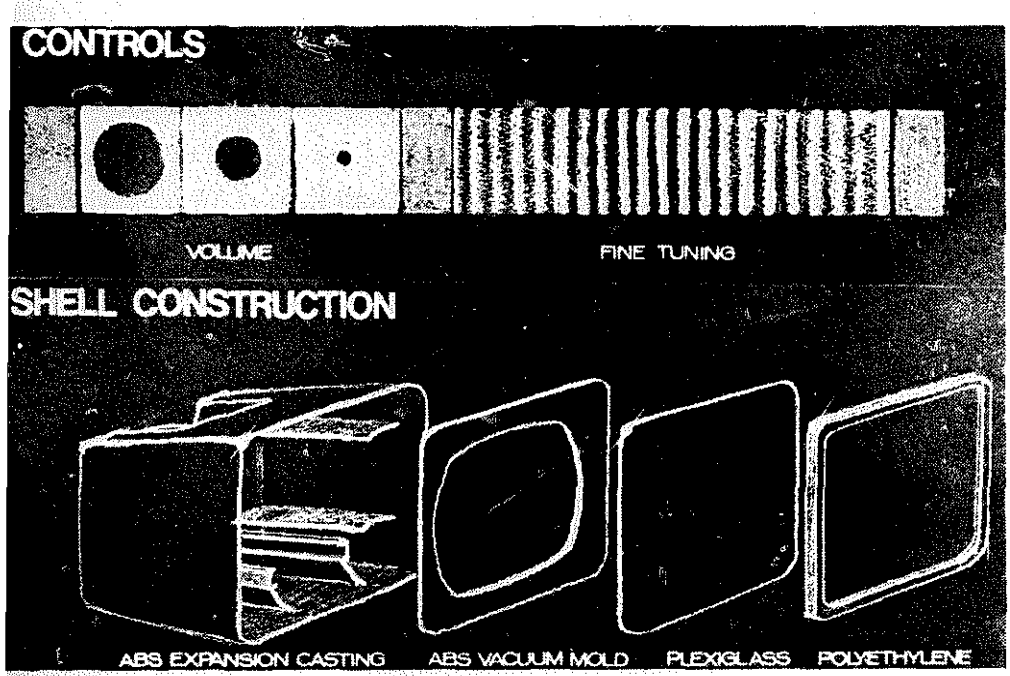
Television was developed in Great Britain and the United States nearly 40 years ago. Since these were the first countries to develop it and because of their market structure, set design has been frozen into early levels, technologically. TV sets in North America show images with a line resolution of 525 lines to the inch. Russian sets have 625; Great Britain has 405 and 625. French sets have a line resolution of 819 to the inch.



Low-cost educational TV set to be built by Africans in Africa. Designed by Richard Powers, as a student at Purdue University.

This means that these images are clearer and demand less from the eye and brain to decode the information. Obviously a television set that is completely new, devoted primarily to educational needs, should carry a high line resolution.

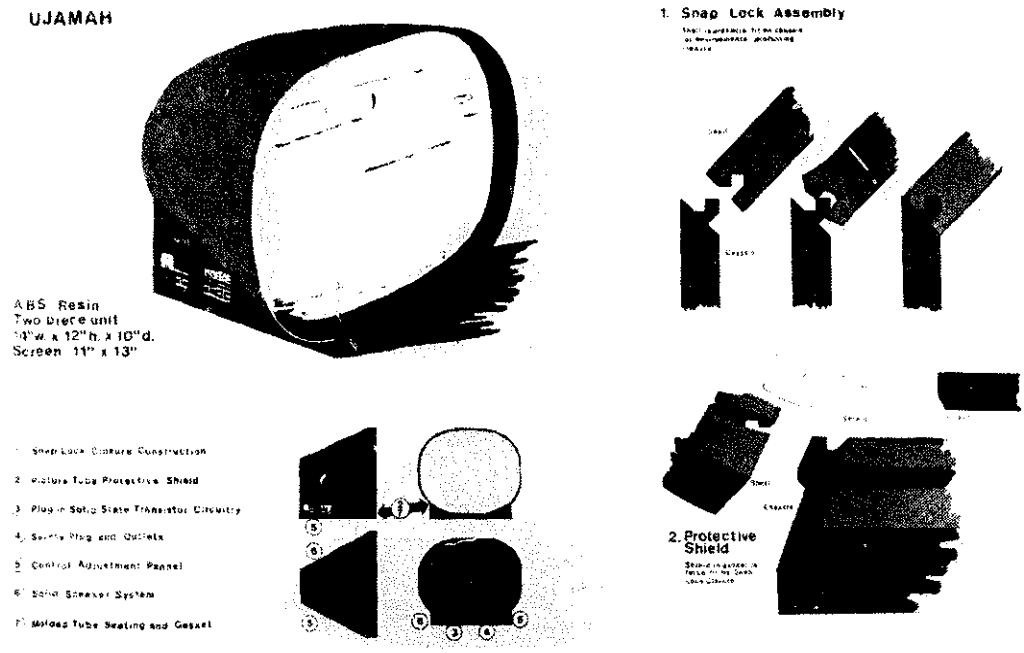
In doing the basic research for this set, my graduate students and I have found much to astonish and delight us. Even in a sophisticated, technologically advanced country like Germany, TV sets have selectors for 13 different channels, even though only 2 channels are used. In our case this entire selection mechanism can safely be left out because we are working on a one-channel set. The eventual breakdown of the vacuum tube is speeded up through the use of on-off switches. We plan to broadcast educational material only, and the set will always be "on." Current drain is negligible with the use of transistors. Since the set must be tropicalized, venting it seemed to be crucial. Tropicalization in Africa, however, also means preventing the entry of thousands of small insects. We found



that through the use of integrated circuits, internal heat build-up was negligible enough to eliminate all need for fans and/or vents. In fact, by burying an aluminum heat sink in the housing of the set, enough heat is drained off.

Our research had to consider climatology, anthropology, electrics and electronics, population densities, prevalence of African languages in various areas, terrain (for transmission reasons), social attitudes, and many other guidelines of design.

After we discovered, somewhat late in our research, that a highly sophisticated, market-competitive TV set (including 36 channels, on-off switching, internal fans, and an inordinate amount of "sexy" styling) sold for $119.95 retail in the United States (including all profits, shipping, and customs charges), we investigated that set. We found that labor, manufacturing costs, and material cost the Japanese manufacturer less than $18. We have accepted the fact that in terms of existing African skills, factories, and distribution



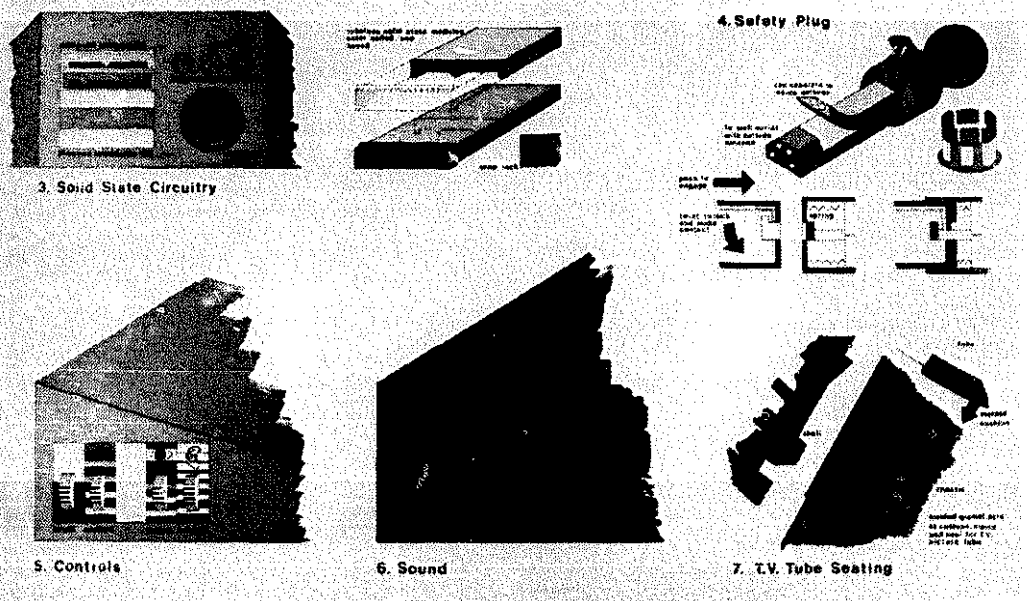
Another version of African TV Crotty, as a student at Purdue

networks, our set can be made for considerably less than $9.

Our final concept of the shell of the TV set will permit both mass production (at the rate of 2,000 shells per machine-day) or individual production by one individual standing in a village street. It can then be *his* decision as to whether he wishes to make 30 shells a day or one every few days.

At the time of this writing (December 1970), the introduction of video-tape cartridges in both black and white and color is only a matter of time. It is for this reason that we are redesigning our educational television set that it will also accommodate the cartridge. There can be no doubt that, especially in areas of education, video cartridges will completely revolutionize the development of the Third World.

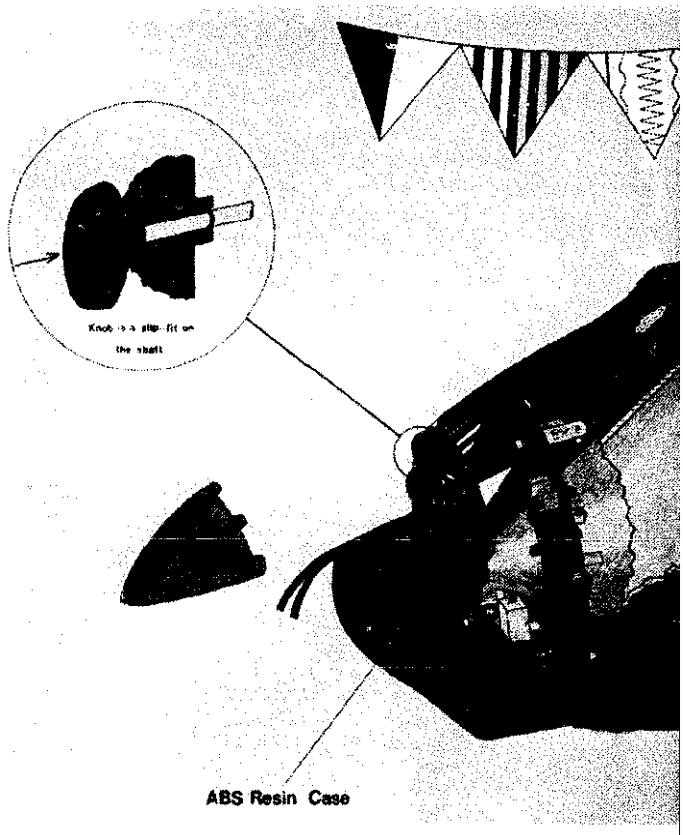
In a short time this $9 TV set will be completed and given to UNESCO. It will join our 9¢ non-electric,



proposal. Designed by Michael
University.

thermocoupled, cow-dung-powered radio (designed for Indonesia).

There are many ways of working for the needs of underdeveloped and emergent countries. The simplest, most often employed, and probably shabbiest is for the designer to sit in his New York, London, or Stockholm office and to design things to be made in, say, Tanzania. Souvenir-like objects are then manufactured, using native materials and skills, with the pious hope that they will sell in developed countries. They do, but for a short while only, for by designing "decorative objects for the home" and "fashion accessories," we merely tie the economy of that country to the economy of other countries. Only two possibilities remain: Should the economy of the wealthy Western country fail, the emergent country's new economic independence fails with it. Should the economy of the wealthy Western country continue climbing, the fashion likes

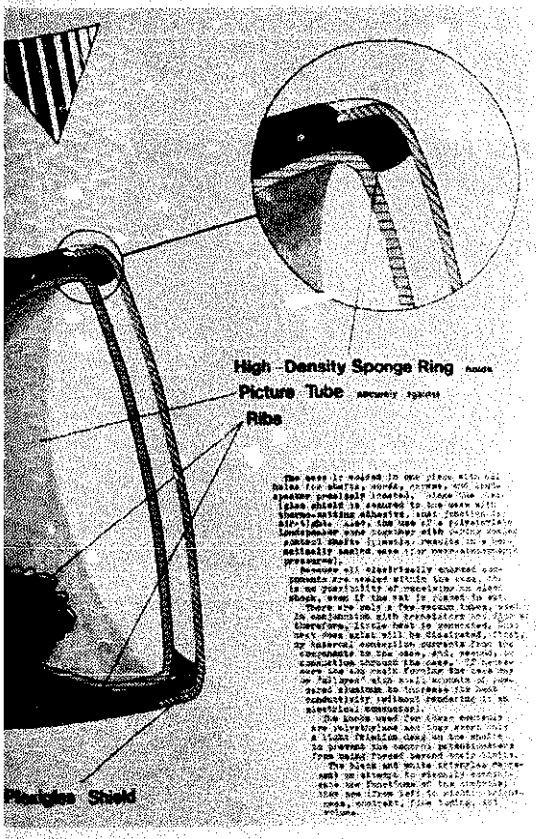


and dislikes of its population will be manipulated even more, and consequently, the emergent country's new economic independence will fail also.

A second, slightly more effective way for the designer to participate would be to spend some time in the underdeveloped country developing designs really suited to the needs of the people there. This still begs the question of meaningful engagement.

A somewhat better way: to move the designer to the underdeveloped country and have him train designers there, as well as designing and working out the logistics of design needs for that nation. But even this is no ideal solution.

Ideally (as things stand now): The designer would move to the country and do all the things indi-



Another version of African TV proposal, designed by Stanhope Adams, Jr., as a student at Purdue University.

cated above. But in addition, he would also train designers to train designers. In other words he would become a "seed project" helping to form a corps of able designers out of the indigenous population of the country. Thus within one generation at most, five years at the least, he would be able to create a group of designers firmly committed to their own cultural heritage, their own life style, and their own needs.

All design must be *operative*. Just as the African TV set becomes synergetically more than a TV set as its manufacture requires new native skills, a large pool of labor reserve, new factories, and new communication channels, design itself must, as shown in the above example, always be a seed project, always operative.

5 OUR KLEENEX CULTURE:

Obsolescence, Permanence, and Value

You have to make up your mind either to make sense or to make money, if you want to be a designer.

—R. BUCKMINSTER FULLER

In all likelihood it started with automobiles. Dies, tools, and molds that are used in manufacturing cars wear out after about 3 years of usage. This has provided the Detroit automobile makers with a timetable for their "styling cycle." Minor cosmetic changes are performed at least once a year; because of the need for rebuilt and redesigned dies, a major style change is plugged in every 2½ or 3 years. Since the end of World War II, the car manufacturers have sold the American public on the concept that it is stylish and "in" to change cars every 3 years, at the very least. With this continuous change has come sloppy workmanship and virtually non-existent quality control. For a quarter of a century American national administrations have proclaimed their tacit approval or enthusiastic support of this system. Some of the economic and waste-making results of this policy have been documented in other chapters. But what is at stake here is an expansion: from changing automobiles every few years, to considering everything a throw-away item, and considering *all* consumer goods, and indeed, most human values, to be disposable.

When people are persuaded, advertised, propagandized, and victimized into throwing away their cars every 3 years, their clothes twice yearly, their high-

fidelity sets every few years, their houses every 5 years (the average American family was moving once every 56 months as I was writing this book), then we may consider most other things fully obsolete. Throwing away furniture, transportation, clothing, and appliances may soon lead us to feel that marriages (and other personal relationships) are throw-away items as well and that on a global scale countries and indeed entire sub-continents, are disposable like Kleenex.

In spite of its shrill and horrifying overtones, Vance Packard's *The Wastemakers* tells the story of forced obsolescence and the death-rating of products like it is.

That which we throw away, we fail to value. When we design and plan things to be discarded, we exercise insufficient care in designing or in considering safety factors.

On April 8, 1969, the Health Department of Suffolk County, New York, reported on their study of color TV sets. Studying sets of all sizes, prices and makes, they discovered that minimally 20 per cent of all color TV sets emitted harmful X-rays at a distance of from 3 to 9 feet. In other words, at least one in every 5 color television sets being used may sterilize the viewer, or subject his or her children to genetic damage after prolonged exposure.

As of April 1, 1969, General Motors was recalling one out of every 7 automobiles and trucks for "remedial repairs" as these vehicles proved themselves clearly unsafe in operation.

More than $750,000 has been awarded to plantiffs or *their survivors* by a jury in Sacramento because of the negligent design of the gas tank on the early Corvette. A jury in Los Angeles gave more than $1 million to several people because of the Volkswagen's poor cornering capability.

On June 29, 1967, Ernest Pelton, a seventeen-year-old playing football for his high school in Sacramento County, California, received a head injury. The depression of the sub-cortical layers of his brain has

plunged him into a permanent coma, and he is not expected ever to regain consciousness. Medical costs for the remainder of his lifetime have been estimated to run in excess of $1 million. What makes the story relevant is that Mr. Pelton wore the best and most expensive ($28.95) football helmet being manufactured. Every year 125,000 of these helmets are sold, yet *they have never been tested for absorption of kinetic energy!* In fact, of the 15 million safety helmets, hard hats, football helmets, etc., sold annually in this country, none have ever been tested in kinetic energy situations!

And the examples, culled from various news accounts over recent years, go on:

A young man is paralyzed for life because the power on his workbench is accidentally activated;

A mother of 3 is killed because her chest is crushed by the steering column in a car crash;

The boom of a large construction crane collapses, and 5 families are left without husbands or fathers;

Six hundred women (a year) lose their hands in top-loading washers;

A young girl leaving a drugstore is literally cut into ribbons because the plate glass door fails to pivot properly after a pebble gets caught in its track;

A crooked union boss fails to see that safety laws on cableways are enforced: a cable shears and 3 miners are crushed;

A tank car carrying carbon dioxide at −20° C. explodes in the middle of a Midwestern town;

Three children are paralyzed from the neck down because they went down a slide head first (slides are badly designed, yet no attention has been given to redesigning them);

A gymnast is made into a quadriplegic because his portable horizontal bar is inherently unstable;

A baby drinks a toxic household cleaner and is brain-damaged for life.

It is probably impossible to make even a ballpark guess regarding the number of deaths and injuries

caused by design. There are a few figures we can start with, however. According to the National Safety Council, we kill an average of 50,000 Americans annually and maim a further 600,000 each year in traffic accidents. According to a report by Dennis Bracken (radio station KNX, Los Angeles, November, 1970), we kill and injure 700,000 children through unsafe toys each year in the United States. According to the National Heart Association, the lives of approximately 50 per cent of all industrial workers are shortened by 5 years or more through heart stress caused by noisy equipment. Unsafe home appliances account for 250,000 injuries and deaths annually. Even the design of so-called "safety equipment" imposes further and greater hazards: "Approved" fire escapes tend to fry people trying to use them. Eight thousand people have died this way over the years when they were trapped by the escape mechanism.

Recently the control panel on stoves has been moved to the rear of both gas and electric units. The manufacturer's explanation is that this will make control knobs more difficult for small children to reach. In reality, a merchandising gimmick is at work here: by running wiring straight up the back of the stove, the stove can be built less expensively, yet sold for more money. The control unit is still there, an attractive nuisance, and children merely have to climb upon a stool and balance precariously while trying to play with the pretty knobs. Often they may fall and burn their arms or faces. A design solution would be simple: a double-security switch that requires both hands to engage "on" (similar to "Record" switches on tape recorders). Instead, appliance manufacturers woo the public with such felicitous confections as a recent Hotpoint range, the oven of which played "Tenderly" whenever the roast was ready. (!)

(Since I collect examples of the idiocies dreamt up by my fellow designers, I found myself enchanted by two new offerings for the 1970 Christmas gift market. One of these was an electric, dial-a-matic Necktie

Selector for the home. You push a series of buttons, specifying shirt color, suit color, and other pertinent data, then a little wheel moves forward and presents the 6 or 10 ties that fit in with your particular color choice. This gadget mounts on the inside of the closet door, comes in a choice of "modernistic" or "Early American," and is only $49.95. The other, alas, was still in the developmental stages in 1970, but they were promising it by *next* Christmas. It was an *electronic* necktie selector that uses a colorimeter and a scanning device to assess your entire wardrobe. No longer will you have to feed color specifications to the gadget and push buttons: instead, the tie selector will take a good hard look at you, scan your "ensemble," and then hand you the tie that is good for you. It seems we will be privileged to buy this for a mere 300 bucks a throw.)

There is no question that the concept of obsolescence can be a sound one. Disposable hospital syringes, for instance, eliminate some of the need for costly autoclaves and other sterilizing equipment. In underdeveloped countries, or climatic situations where sterilization becomes difficult or impossible, a whole line of disposable surgical and dental instruments will become useful. Throw-away Kleenex, diapers, etc., are certainly welcome.

But when a new category of objects is designed for disposability, two new parameters must enter the design process. For one thing, does the price of the object reflect its ephemeral character? The 99¢ paper dresses cited before are excellent answers to changing fashion or to travel needs, or in the area of temporary protective clothing. But this is not the case with the $149.50 paper dress.

The second consideration deals with what happens to the disposable article after it has been disposed of. Automobile junkyards follow our highways from coast to coast. And even these appalling smears on the landscape at least have a (painfully slow) rusting process in their favor, so that five or twenty years hence they

will have turned to dust. The new plastics and aluminum will not disintegrate, and the concept of being up to our armpits in discarded beer cans is not a pleasant prospect for the future.

It is here that bio-degradable materials (i.e., plastics that become aborbed into the soil, water run-off, or air) will have to be used more and more in the future. The Tetra-Pak Company, responsible for the distribution of seven billion milk, cream, and other packages a year, is now working on an ideal self-destructive package in Sweden. A new process, developed in collaboration with the Institute for Polymer Technology in Stockholm, accelerates the decomposition rate of polyethylene plastics. Thus, packages will decompose much more rapidly after they have been discarded without having their strength and other properties affected while still in use. A new disposable, self-destructive beer bottle called "Rigello" is already on the market. Much more than these Swedish experiments will have to be done to save us from product pollution.

Fortunately, it has now become possible to use *the actual process of pollution* to bring about positive results. The result of a recent design research problem conducted with two graduate students is a good example.

We began by studying cockleburs, burdocks, and other botanical seeds that possess "hooking mechanisms." Out of this we developed an artificial hooking seed, approximately 40 cm. in length and made out of a bio-degradable plastic. The particular plastic chosen has a half-life of about 6 to 8 years. All plastic surfaces of these constructs are dipped in plant seeds and encapsulated in a hydrotropic nutrient solution. These "macro-seeds" are furnished folded flat, but spring-loaded, 144 to a package. When the package rips open, the macro-seeds spring into shape and (assuming there are hundreds of them) become inextricably hooked to one another (see illustration). The theoretical concept is an extraordinarily simple one. It is possible to

drop thousands of these seeds from airplanes into dry-wash areas of arid, desert-like country. Once dropped, the seeds spring open and interlink. With the first rain or even a substantial increase in moisture content of the air, the plant seeds on the surface of the artificial seeds begin to sprout (helped along by the nutrient solution encapsulating them). The macro-seeds themselves, helped along by these newly sprouted organic seedlings, now form a low but continuous dam. (Such a dam can be theoretically infinite in length, and would be around 20 to 30 cm. in height. The experimental dam we constructed at a dry-wash area is 17 meters long.)

The dam, consisting by now of macro-seeds that are hooked together and further augmented by true organic growth, begins to catch the first spring run-offs. Seeds, mulch, topsoil, and other organic principles are captured by it; the dam grows both literally and figuratively. Within 3 to 6 seasons it has grown into a compact area of vegetation and a permanent trap for capturing topsoil. Towards the end of this time period the bio-degradable plastic core begins to be absorbed by the surrounding vegetation and soil and turns into a fertilizing agent.

Experimentally at least, the erosion cycle has been halted and in fact reversed.

The component factors of obsolescence, disposability, and self-destruction have been used for an ecological alteration, and an attempt has been made to salvage desert areas by introducing new thinking into design and planning.

To return to the primary concept of a disposable society: With increasing technological obsolescence, the exchange of products for newer, radically improved versions makes sense. Unfortunately, as yet there has been no reaction to this new factor on the market level. If we are to "trade in" yesterday's products and appliances for today's, and today's for tomorrow's at an ever-accelerating rate, then unit cost must reflect this

Artificial burrs, 40cm long, made of bio-degradable plastic and coated with plant seeds and a growth-boosting solution. To reverse erosion cycles in arid regions. Designed by James Herold and Jolan Truan, as students at Purdue University.

tendency. Slowly, two methods of dealing with this problem are beginning to emerge.

Leasing rather than owning is beginning to make headway. There are a number of states in which it is less expensive to lease an automobile on a 3-year contract than to own one. This concept has the added

motivation built in that the man who leases his automobile is no longer bothered by maintenance cost, insurance, fluctuating trade-in values, etc. In some of our larger cities it has become possible to lease such large appliances as refrigerators, freezers, stoves, dishwashers, washer and dryers, air-conditioning units, and TV sets. This trend has grown even more pronounced in manufacturing and office situations. Maintenance and service problems surrounding the hardware in the computer, research lab, and office-filing fields make the leasing of equipment more and more rational. Property tax laws in many states are also helping to make the concept of "temporary use" rather than "permanent ownership" more palatable to the consuming public.

It now becomes necessary only to convince the consumer that, in point of fact, he *owns* very little even now. The homes which make up our suburbs and exurbs are purchased on 20- or 30-year mortgages, but (as we have seen above) with the average family moving every 56 months, are sold and resold many times over. Most automobiles are purchased on an installment plan lasting 36 months. They are usually traded in 4 to 6 months before the contract is completed, and the still partially unpaid-for car is used as a trade-in. The concept of ownership, as it applies to cars, homes, and large appliances in a highly mobile society, becomes a mere polite fiction.

This is indeed a major volte-face regarding possessions. It is a change of attitude often condemned out of hand by the older generation (who are sublimely unaware of how little they themselves, in fact, ever own). But this moral condemnation is not really relevant and never has been. The "curse of possessions" has been viewed with alarm by religious leaders, philosophers, and social thinkers throughout human history. And the concept of being owned by things, rather than owning them, is becoming clear to our young people. Our greatest hope in turning away from a gadget-happy, goods-oriented, consumption-motivated

society based on private capitalist acquisitive philosophies, lies in a recognition of these facts.

A second way of dealing with the technological obsolescing of products lies in restructuring prices for the consumer market. On Sunday, April 6, 1969, *The New York Times* carried an advertisement for an inflatable easy chair (imported from England) at a retail price of $6.95 (including shipping, taxes and import duties). Within 5 days mail and telephone orders were received for 60,000 chairs. A few years ago hassocks and occasional chairs made of plastic-reinforced cardboard were available at such discount outlets as Pier 1 and Cost Plus at prices ranging from 59¢ to $1.49. Such items, combining usefulness, bright color, modish design, comfort, extremely low cost, light weight, and easy "knock-down factors" with eventual nonchalant disposability, naturally appeal to young people and college students. But their appeal is filtering down to larger and more "settled" segments of the population as well.

Mass production and automation procedures should make an increasing number of inexpensive, semi-disposable products available to the public. If this trend continues (*and does not lead to waste-making and pollution*), it is a healthy one. If further justification were needed for this throw-away society on moral grounds, a corollary trend has already begun to make its appearance. A home containing inexpensive plastic dinnerware will, often as not, also contain one or two pieces of fine craftsman-produced ceramics. The 99¢ paper dress will be dramatized with a custom-designed, custom-made ring created specifically for the wearer by a silversmith. One of the inexpensive cardboard easy chairs (bought a few years ago at Cost Plus) may well contain a $60 hand-woven cushion (bought at a prestigious craft shop or a gallery). In fact, the current renaissance of the crafts is partially traceable to consumer money liberated for investment in these custom-made art objects through the reduction of prices for everyday goods.

This trend is by no means in full force as yet. But if we look to moving day in 1999, we may well see a family loading their car with a few boxes full of art and craft objects, ceramics, hand-woven cushions and wall-hangings, books and cassettes while nearly all of the so-called "hard goods" have either been returned to the lessor or thrown away, to be replaced by newly leased appliances and inexpensively purchased furnishings at the point of destination.

If we summarize, we see readily that certain aspects of our Kleenex Culture are unavoidable and, in fact, beneficial. However, the dominance of the market place has so far delayed the emergence of a rational design strategy. Obviously, it is easier to sell objects that are thrown away than objects that are permanent, and industry has done little or nothing to decide what should be thrown away and what should not. It is also much pleasanter (for shareowners, and vice-presidents in charge of marketing) to sell throw-away things that are priced as if they were to be kept permanently. The two alternatives to the present price system, leasing, or lower prices combined with the customers' investment recovery through meaningful trade-in or "model-swapping," have not been explored. Technological innovation is progressing at an ever-accelerating pace while raw materials disappear. (Thus it is instructive to note that it takes about 850 acres of Canadian timber to print one Sunday's *New York Times*. To which may be added: *The New York Times* Sunday edition sells for 50¢ and contains more paper and typography than an unillustrated novel retailing for $7.95. While the *Times* carries about 500 photographs and drawings in its Sunday edition, and a novel does not, book-binding costs average 22¢ per book. It costs the city of New York nearly 10¢ per copy each week to clean up discarded copies of the Sunday *New York Times*.)

The question of whether design and marketing strategy is possible in these areas under a system of private capitalism remains experimental. But it is obvious that in a world of need, answers to this question must be found.

6 SNAKE OIL AND THALIDOMIDE:

Mass Leisure, and Phony Fads in the Abundant Society

> Our enemy is self-complacency, which must be eliminated before we can really learn anything.
>
> —MAO TSE-TUNG

All right: the designer must be conscious of his social and moral responsibility. For design is the most powerful tool yet given man with which to shape his products, his environments, and, by extension, himself; with it, he must analyze the past as well as the foreseeable future consequences of his acts.

The job is much harder to do when every part of the designer's life has been conditioned by a market-oriented, profit-directed system such as that in the United States. A radical departure from these manipulated values is difficult to achieve.

> It is the more fortunate nations, those favored by their geographical position and historical circumstances, that today show a grosser spirit and a weaker hold on moral principles.
>
> Nor would I call these nations happy in spite of all the outward signs of their prosperity.
>
> But if even the rich feel burdened by the lack of an ideal, to those who suffer real deprivation an ideal is a first necessity of life. Where there is plenty of bread and a shortage of ideals, bread is no substitute for an ideal. But where bread is short, ideals are bread. (Yevgeny Yevtushenko, *Precocious Autobiography.*)

All design is education of a sort. It may be education by studying or teaching at a school or university, or it may be education through design. In the latter case the designer attempts to educate his manufacturer-client and the people at the market place. Because in most cases the designer has been relegated (or, more often, relegated himself) to the production of "toys for adults" and a whole potpourri of gleaming, glistening, useless gadgets, the question of responsibility is a difficult one to raise. Young people, teenagers, and pre-pubescents have been propagandized into buying, collecting, and soon discarding useless, expensive trash. It is only rarely that young people overcome this indoctrination.

One notable rebellion against it, however, did occur in Sweden a few years ago when a 10-day "Teenagers' Fair" attempting to promote products for a teen-age market was boycotted so throughly it nearly got put out of business. According to a report in *Sweden NOW* (Vol. 2, No. 12, 1968), a good number of youths resisted what they considered over-consumption by holding their own "Anti-Fair," where the slogan of the day was "Hell, no, we won't buy!" On the big day, buses collected teens from all over Stockholm and drove them to experimental theaters where special programs of politically engagé films and plays were scheduled and such subjects as world hunger, pollution, and drugs were discussed in workshop sessions. In the kids' opinion, the "Teen-agers' Fair" was just the beginning of a systematic plan to exploit young Europeans by enticing them to want more clothes, cars, and "status junk."

But Sweden (once again) is the exception rather than the rule.

Interestingly, the idea of "pure" design and the moral neutrality of the designer always comes up when designers achieve official status or become salaried or subsidized. It seems like an attempt to affirm the identity of the designer and to protect him against officious interference by managerial groups; unfortu-

nately, it is also self-deception and a hoax perpetrated against the public. To paraphrase freely from Paul Goodman's *Like a Conquered Province*, in America at present the great bulk of the billions of dollars for science and design is for research on extrinsically chosen problems, or even on particular products. Of nearly $20 billion marked by government and corporations for research and development, more than 90 per cent is devoted to last-stage designing of hardware for production. Corporations mark up prices 1,000 per cent in order, they say, to pay for basic research, but much of the research is to by-pass other firms' patents. It is hard to believe that this kind of science or design is disinterested and that promoters are not using the prestige of design and science as a talking point. Goodman concludes: ". . . I have heard distinguished scientists—for instance at the California Institute of Technology—mention their guilt at bilking the government out of money that, they know, is *NOT* going to pay off as the government wishes!"

It might be instructive to see just what would happen if *all* social and moral obligations were to be removed from designer and manufacturer alike. What if the advertising, design, manufacturing, market research, profiteering complex were really to be given free rein? Assisted by their tame "scientists" in psychology, engineering, anthropology, sociology, and intermedia, how would they change, or distort, the face of the world?

Last year, in order to illustrate what might happen if design were to continue completely unchecked, I wrote a brief satirical piece that tried to show how the combination of irresponsible design, male chauvinism, and sexual exploitation might be highly destructive. Entitled "The Lolita Project," it appeared in the April, 1970, issue of *The Futurist* (pp. 52–55). My satire concerned itself with a proposition that, in a society that views women as objects for sexual gratification, an enterprising manufacturer might well begin tooling up for the production and marketing of artificial

women. These plastic women were to be animated, thermally heated, response-programmed units, retailing at around $400, in a vast choice of hair colors, skin shadings, and racial types. It also suggested various improvements upon nature, offered by a Special Products Division that would fill orders for, say: a 19-foot-tall, lizard-skin-covered woman equipped with 12 breasts, 3 heads, and programmed to be aggressive.

To my surprise, I began receiving much correspondence as a result of my article. A Ph.D. teaching social psychology at Harvard has written me four times regarding a license to begin manufacturing. Industrial designers from many countries are still writing, offering me money to go into partnership with them and begin turning out Lolita units. A full-size plastic doll (which the Swedish press and I feel resembles Jackie Kennedy Onassis) is now available in three hair colors for $9.95. And at the time of this writing, the December, 1970, issue of *Esquire* magazine is featuring the construction of such women, with a cleverly faked color photograph.

But my plastic-woman article was merely a very slightly exaggerated projection of standard marketing methods and practices.

One early use of project design to support political aspirations is recorded in Jay Doblin's *One Hundred Great Product Designs*. In 1937, aware of its fantastic propaganda value, Adolf Hitler placed high on his list of Nazi priorities the design of a car for everyone. He ordered the creation of a new automobile firm, the Volkswagen (People's Car) development company. In early 1939 the VW plant began in a non-existent town, later to be called Wolfsburg:

> Hitler was convinced that large automobiles—the only type produced in Germany during the early '30's—were designed for the privileged classes and are therefore opposed to National Socialist interests.

Advertisement from *Argosy*, February, 1969. A result of irresponsible design.

In the spring of 1933, he met with Ferdinand Porsche to plan such a car for the masses—the *Klein-auto.* Porsche, who had experimented with smaller cars for many years, saw in Hitler's enthusiasm the opportunity to realize a dream. Porsche was one of the most highly regarded automotive engineers in Germany at the time. As chief engineer for a number of automobile companies including Lohner, Austo-Daimler, Daimler-Benz and Steyr, Porsche was ideally suited to the task. He and the Führer agreed that the "people's car" should be a four-passenger vehicle with an air-cooled engine, and average between 35 and 40 miles per gallon, and a top speed of 70 mph. In addition, Hitler stipulated it should cost the German worker approximately $600 to purchase. A sum of $65,000 was appropriated to underwrite preliminary development costs; Porsche completed the first prototype car about two years later in his Stuttgart workshop.

In the United States, design is not overtly used in a political manner: rather, it unblushingly serves purely profit-oriented clients. But the implicit message of most of this design is one that caters almost exclusively to the wants of the upper middle class.

Design at present operates only as a marketing tool of big business. Industrial design specifically was created during the Depression of the thirties to help industry reduce costs and improve appearance, as previously discussed. And the business community aims towards the strivings of the middle and upper middle class as the most rewarding market. Because of the unusually short time during which industrial design has existed as a discipline, it is a field that in the United States is dominated almost entirely by the men who first created it, or by their immediate successors. In other words, design in the United States is largely run by a middle-aged or elderly design-entrepreneur class who, in C. Wright Mills's phrase, are "independent middle-class persons, verbally living out Protestant ideas in small-town America." If one looks through a

recent coffee-table volume entitled *Design in America* confected by the members of the Industrial Designers Society of America, it is appalling to see how dehumanizing and sterile everything looks. In hundreds of pictures the members of IDSA are obviously trying to present their best face to the world; the result is a collection of elitist trivia for the home and anti-human devices for the working environment.

In order to work more intelligently, the whole practice of design has to be turned around. Designers can no longer be the employees of corporations, but rather must work directly for the client group—that is, the people who are in need of a product.

At present the role of the designer as an advocate does not exist. A new secretarial chair, for instance, is designed because a furniture manufacturer feels that there may be a profit in putting a new chair on the market. The design staff is then told that a new chair is needed, and what particular price structure it should fit into.

At this stage, ergonomics (or human factors design) is practiced and the designers consult their libraries of vital measurements in the field. Unfortunately, most secretaries in the United States are female, and most human factors design data, also unfortunately, are based on white males between the ages of eighteen and twenty-five. As the few books in the bibliography that deal with ergonomics show, the data have been gathered almost entirely from draftees inducted into the Army (McCormick), Navy personnel (Tufts University), or Dutch Air Force personnel (Butterworth). Aside from some interesting charts in Henry Dreyfuss's *Designing For People, there simply exist no data concerning really vital measurements and statistics of women, children, the elderly, babies, the deformed, etc.*

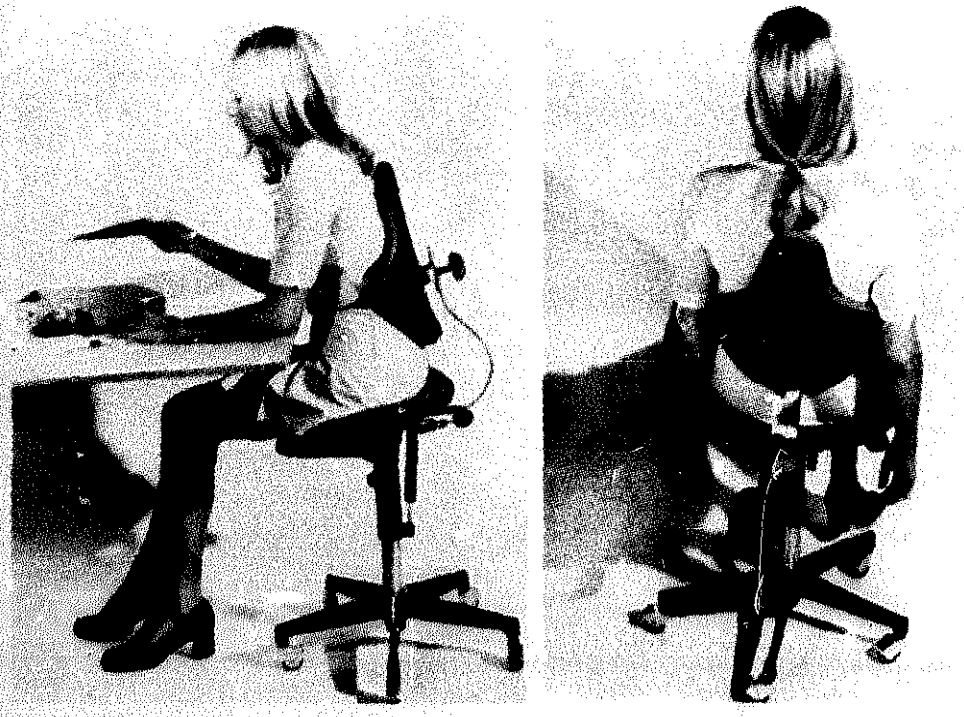
At any rate, based on a manufacturer's hunch that a new secretarial chair might sell, substantiated by extrapolating and intrapolating the measurements of Dutch pilots during World War II, and fleshed out by

whatever stylistic extravaganzas the designer performs, the prototype chair is now ready. Now begins consumer testing and market research. Stripping this research of all the mystical clap-trap supplied to it by the snake-oil brigade from Madison Avenue, this means that a few chairs are either tested or sold under highly controlled circumstances. They may, for instance, be sold through a leading department store in six "test cities." (These are cities of medium population and median income, and are towns in which money is usually alleged to be "ready for new ideas." San Francisco, Los Angeles, Phoenix, Arizona, Madison, Wisconsin, and Cambridge, Massachusetts, are 5 out of a list of 50 such towns.) Stores in which such testing is carried on are usually the leading shops or department stores in their line, catering to a white middle-class audience. So much for market research.

Consumer testing is frequently done in one of two ways: either secretaries are urged to sit in the chairs for however long it takes them to type one sentence (after which their attention is directed towards the delicious upholstery color and texture), or else the chair is sat upon for hundreds of hours by a *machine* to see if one of the chair legs will break off. Neither test, I would submit, really gets down to the fundamentals: do different secretaries experience major discomfort while working hard, seated in a chair for a series of four-hour periods, stretching over weeks, months, or years? *More crucial still is the fact that almost nothing industry designs and markets is ever retested.* If it sells, swell.

When we work as a cross-disciplinary team to design a better chair for secretaries, who are we de-

Secretarial Posture Chair, designed by "Team Design," Bohl, Kunze, Scheel, and Grünschloss of Stuttgart. Courtesy of *Infordesign* magazine, Brussels.



signing for? Certainly the manufacturer wants to build secretarial chairs only to sell them and make money. The secretary herself must be part of our team. And when the chair is finished (interior designers, decorators, office planners and architects please note!) there must be *real* testing. Nowadays an "average" secretary is usually asked to sit in the new chair, sometimes even for 5 minutes, and then asked, "Well, what do you think?" When she replies, "Gee, the red upholstery is real different!" we take this for assent and go into mass production. But typing involves 8 hours a day, long stretches of work. And even if we test secretaries intelligently on these chairs, how can we see to it that it is *the secretaries themselves who make the decision as to which chair is bought?* Usually *that* decision is made by the boss, the architect, or (God save us) the interior decorator.

And this turnabout in the role of the designer can be accomplished. Our role is changing to that of a "facilitator" who can bring the needs of the people to the attention of manufacturers, government agencies, and the like. The designer then logically becomes no more (and no less) than a tool in the hands of the people.

As it happens, much has already been said about the inadequacy of chairs for typists. And now, finally, a typist's chair has been designed in which secretaries formed part of the planning team and tested it thoroughly. The chair was designed by a team called *Umweltgestaltung*, of Stuttgart. Ergonomics, which was studied in detail, was handled by Ulrich Burandt and the Institute for Hygiene and Workers' Physiology in Zurich, Switzerland, and the chair is manufactured by Drabert & Sons of Minden, Germany. It is thoroughly documented in *Infordesign*, No. 34 (Brussels). But one can only fear that what American designers like to call "sexed-up" chairs will outsell it when it reaches the market place in this country. And it should be remembered that, in any case, secretaries almost never have any say in their employers' purchase of chairs.

If we switch examples from a secretarial chair to a small refrigerator, then entirely new standards are involved. With present marketing and sales structures, an inexpensive refrigerator is merely a refrigerator that has been stripped of "added features." Should someone suggest that the new refrigerator does not fit the needs of residents of the ghetto, low-income families, and other foreseeable users, market research teams have ready answers. The inner-city blacks we are told, are "too irresponsible to use it wisely," the life style of the low-income families is based on "eroding family structures," etc. In other words, the faults of our society are blamed on its victims. As William Ryan points out in his most recent book, *Blaming the Victim*, this is a splendid cop-out, and a wonderful way to get rid of one's feelings of responsibility.

In American society we are daily prompted to feel that there is inherently something shameful and wrong in being "low income."

Design indeed still has far to go. During 1970/71, an all-European design competition concerned with table settings was held under the sponsorship of *Gruppe 21* in West Germany. The competition bore the title *"Tisch 80-Bord 80."* The most responsible entry from an ecological viewpoint was submitted by a former student of mine, Mrs. Barbro Kulvik-Siltavuori of Finland. Where everything else submitted attempted to pander to style-consciousness, consumerism, and induced aesthetic feelings of "object-love," her submission concerned itself with aspects of recycling.

Her proposal, instead of concerning itself with design in the usual sense, attacked a socially relevant problem of the abundant society. Significantly (for an entry from Finland), it opposed the collection of pretty dishes and handsome glasses and storing of these objects until they either become damaged or are replaced for reasons of manipulated "taste."

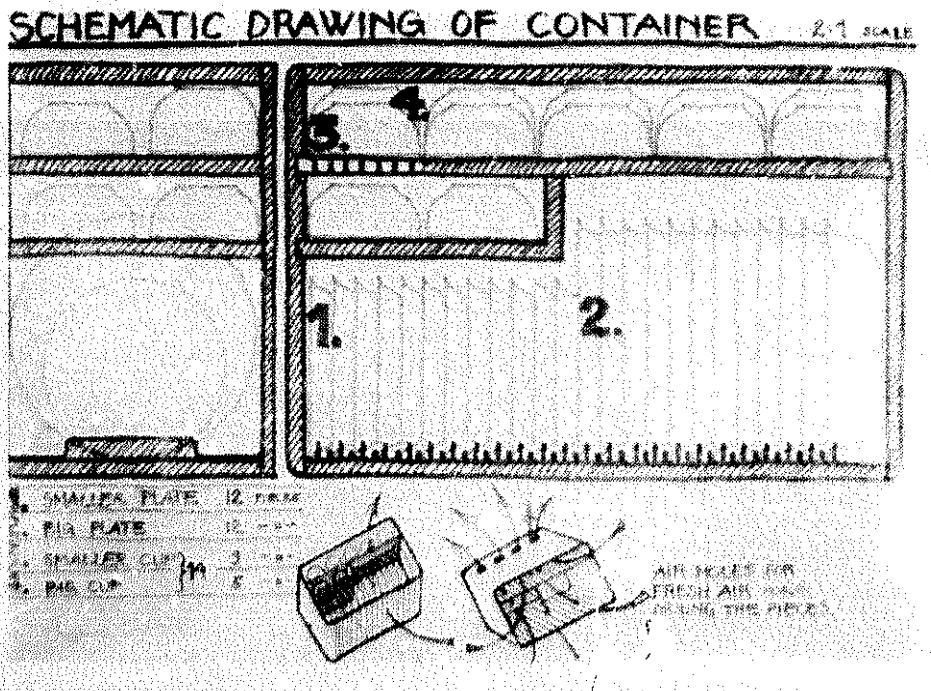
It was proposed to restrict dishes (at least for special purposes and population groups) to three parts

which satisfy minimal need requirements: a large plate, a small plate, and a mug for liquids. Mrs. Kulvik-Siltavuori suggested salt-glazed red clay as a possible material; another suggestion was plastic. She quite properly felt that differences in glaze, coloration, or size were completely negligible when compared with extreme low cost.

These seasonal dishes come in an aerated plastic container which is designed to make possible washing, drying and storage of the dishes in the same container. But more importantly, broken dishes and mugs can be returned (like empty beer bottles or recyclable milk bottles) in a garbage sack which is supplied as part of the system. The manufacturer can then use the recycled dishes as raw material: new dishes can be made out of some of the returned plastic, bricks out of the fired clay, etc.

What is important is how the design establishment reacted to her entry. The entry was awarded the *fifteenth* prize (out of fifteen), and the jury remarked:

Drawing of aerated washing, drying and storage container for recyclable dishes designed by Mrs. Barbro Kulvik-Siltavuori of Finland. (Courtesy: Barbro Kulvik-Siltavuori and Gruppe 21.)



"This concept has considerable originality. . . . At any rate, we know how to appraise the humor of this solution. It is an *amusing* provocation against existing conditions."

As we are taught to equate power, money, and possessions, we deny access to goods to those who are poor or in need. Low income means buying used appliances from Goodwill or the Salvation Army or doing without them entirely. Certainly nothing is designed for the low-income group. The philosophy behind this is that "if only these people had more money," why then they could participate in the "American Dream." In this way we manage to separate out all minority groups—and artificially create quite a few new ones. These minority groups are people who deviate from the arbitrary norms established by the ruling middle-class power structure. By fractionalizing these minorities even further (it seems that there are "educable blacks," "deserving poor," "exceptional children," etc.) and blaming them for the problems which we tell them they have, we have managed to induce in ourselves a specious feeling of superiority and a sense of belonging to whatever Silent Majority is the norm.

It is obvious that the skills of the designer must be made more accessible to all the people. This will mean the restructuring of the role of the designer into that of a community problem-solver. His only allegiance will be to the "direct" clients, the actual users of the devices, tools, products, and environments that he designs. His secondary role will be that of facilitating the production or redesign of these things. When such an idea is proposed to industries, they immediately bemoan the lack of citizen participation. Teachers tell us that parents won't come to PTA meetings; community organizers inform us that citizens won't join their block organization; the tenants, planners tell us, won't come to neighborhood urban renewal meetings. Isn't it interesting to note that *we accuse people of apathy at the very same time they themselves complain about being excluded?*

But probably the most telling point that can be made against the design profession lies in the fact that nearly everything mentioned above is never discussed in either schools or offices.

Of course, there are certain differences in design as it is practiced and thought about by various age groups and nationalities. Most of the arguments put forward above would be considered just simple common sense by the majority of designers practicing in Sweden, Finland, and most of the socialist countries. In the United States, many design students, and quite a few younger designers, feel a tremendous emptiness in their role and an incongruence of what they think to what they do.

Lately some designers in the United States have even been known to permit themselves to *feel* (besides thinking and designing). But most designers still think that their employment as servants of the military-industrial complex is one of the "givens." A curious note of paternalism still dominates design thinking. As the head of one of the largest Chicago design offices said to me at a recent meeting: "We've got to do something for the migrant workers that is good for them—but not too good, or they'll never get off their asses!" When the residents of a low-income area in Lafayette, Indiana, were designing a playground together with architectural students from Notre Dame University a solution was presented in the neighborhood council that better suited the community's desires. "They can't do that, those are *my* niggers!" was the reaction of one of the design students.

Rather than leaving this unresolved series of charges against the design profession, I would like to give an example of how things *could* work.

My daughter, Jenni Satu, is almost six months old now and has learned to sit on the floor, wobble a little bit, and play. This is a good time to acquaint her with books. Since paper or plastic pages have a tendency to cut sensitive little fingers, and since books made for small children and printed on heavy card-

board have pages that are difficult for them to turn, I began looking around for cloth books. There are some. In fact, there are *eight!* and they are all manufactured by the Hampton Publishing Company, of Chicago. Each book consists of a cover, a back, and 3 (count them, *three!*) leaves, thus a total of *6 pages per book.* They sell for $2 *each!* They are printed in non-toxic colors on cloth. The illustrations, while reminiscent of romantic paintings done about 100 years ago, were actually done in 1935. Under each of the pictures that make up a book there is printed a help-

Shown is a commercially available baby book that costs $2. Below is a redesigned book, more suited for a child's needs and estimated to sell for 60 cents. Designed and developed from an idea of the author's by Arlene Klasky, California Institute of the Arts.

ful descriptive phrase such as "BALL." Since most one-year-olds are incapable of reading and, if read to, demand greater verbalization than that, both pictures and text don't apply. A small child is turned on to textures, color contrasts, optical effects, and things it can suck. So one of my students has designed a new book: it has 10 leaves, or 20 pages. One of them is a small pocket with teddy-bear-textured cloth on the inside. Another page is a mirrored cloth surface. Still other pages present simple color spots, optical saturation patterns, textures that feel good and things that go squeak. In addition, the pages are split horizontally so that the child can combine the 10 pages into over 40 patterns. It is still made of cloth. The colors are still non-toxic, and it can now sell for *59¢*. But that is not the end of the design process: my student has also set up a jig, so that these books can be made by blind people, either in hospitals or as a sort of "cottage industry" project. Through this design it was possible to combine an advocacy for two groups: to give delight to small children, and also to supply the need for meaningful work for the blind.

As indicated throughout this book, design is discriminatory against major sections of the population. Just by comparing the controls, switches, knobs, and general design of those tools and appliances which in our society seem to be in the province of women ("homemakers") with those that seem to be "male-oriented," we can see vast differences. In spite of the clients' differing age, occupation, sex, schooling, etc., most designers seem to design for an exclusively sexist, male chauvinist audience. The ideal consumer is between eighteen and twenty-five, male, white, middle-income, and if we look at ergonomic data published by designers themselves, *exactly* 6 feet tall, weighing *exactly* 185 pounds. We have seen that the amount of testing done among various population groups is tokenism at best. Furthermore, designers know very little about what people really need or want.

By studying the curricula of 58 schools that teach design, I find that courses in psychology and the social sciences are nearly always absent. When they do exist, they operate under the nomenclature of *Consumer Preferences 201, The Psychology of the Market Place,* and *Buying Behavior of Consumer Groups.* There are some such psychology and social science courses taught to latent designers at such places as Purdue University, University of Southern California, and the School of Design, Illinois Institute of Technology. (It is only fair to point out that the School of Design, California Institute of the Arts, is a notable exception to this: here the mix between social psychology, and other behavioral sciences and design is firmly established. But a new danger has arisen: some designers and their students play with pop sociology instead of designing. It is obvious that better solutions to the design problems of the real world will come from young people *skilled in the discipline of design,* not by untrained dilettantes toying with "trendy" radical chic.)

Going beyond the badly designed objects that occupy space in our world, are there any good things that many people can afford? It may be useful to examine what *is* available that is both well designed and reasonably priced. While I was still in school, *Interiors* magazine coined the phrase: "The Chair as a Signature Piece of the Designer." Good or bad, the phrase has stayed. Today the consumer who wishes to buy a chair is faced by a bewildering array of 21,336 different models. Many of these are American, but we also import, from Finland, Sweden, Italy, Japan, and many other countries. There are chairs in production that are careful copies of seating units from predynastic Egypt; other inflatable chairs, incorporating the most recent bits of plastic and electronics, owe their aesthetic debts to the latest moon shot. In between there are faithful reproductions of Hepplewhite, Early American, Duncan Phyfe, and much else, including newly created styles such as "Japanese Co-

lonial," "Plastic Baroque," and the "Navaho Look." Prices vary: it was possible to get an inflatable chair for as little as 59¢; an easy chair now sold that is part Swedish but features Japanese electronics in its stereo head-sets and a German impeller motor for a rippling motion in the back rest, sells for a cool $16,500 each. Aesthetically, as well as for many specific functions of use, or telesic aptness, there are probably at least 500 "good" chairs. But we might concern ourselves with 3 chairs I consider great, 2 of which have stood the test of time so well that most people are astounded when they find out when these chairs first came into being.

The Director Chair in its most current version is a scissor-legged wooden construction with slip-on seats and back, made of No. 8 duck, with a 300-pound test strength. It is extremely comfortable to sit in for long periods of time, and that is quite unusual for a chair without cushions or pads. For storage or ease of shipping, it folds up into a compact package, weighing less than 15 pounds. It has another unusual advantage in that it can serve equally well as an easy chair, desk chair, lounge chair, or dining chair. We use eight of them in our home, their light weight, compactness, and ease of maintenance together with great comfort and low price making them especially attractive chairs for today's greater mobility and changing life styles. At present, the chair can be bought from Sears Roebuck for $12.88. Jay Doblin, in his book *One Hundred Great Product Designs*, calls it ". . . a tremendous buy, probably the best dollar's-worth of furniture available." Most people, when asked to put a date to it, assume that it was designed during the late forties. They are mistaken by one century. The chair can be seen in early French and American photographs and reappears more frequently in pictures made during the Civil War. In its present form it is produced by a number of firms: the Telescope Folding Furniture Company of Granville, New York, and the Gold Medal